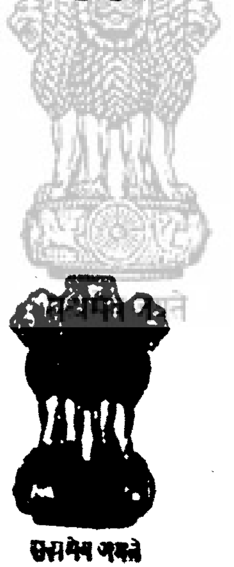
GOVERNMENT OF INDIA
MINISTRY OF LABOUR AND EMPLOYMENT

REPORT
OF
THE MINERS' BOOTS COMMITTEE



(*December 1959*)

Report
of
The Miners' Boots Committee
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REPORT

OF

THE MINERS' BOOTS COMMITTEE

(December 1959)

1

INTRODUCTORY

Appointment of the Committee. A committee, which has since come to be known as the Miners' Boots Committee, consisting of the following members, was set up by the Ministry of Labour and Employment on the 2nd September 1959 for the purpose of evolving specifications for a suitable type of footwear for miners:—

Chairman

(1) Shri K. N. Subramanian, I.C.S., Joint Secretary to the Government of India, Ministry of Labour and Employment.

Members

(2) Shri N. S. Mankiker, Chief Adviser Factories, Ministry of Labour and Employment.

(3) Shri P. C. Ahluwalia, Works Manager, Harness and Saddlery Factory, Kanpur.

Secretary

(4) Shri A. P. Veera Raghavan, Under Secretary to the Government of India, Ministry of Labour and Employment.

2. Shri D. N. Sen, Control Officer, Chief Inspectorate of Textiles and Clothing, Kanpur, was co-opted as a member of the Committee on the 15th September 1959. Dr. Sadgopal, Deputy Director, Indian Standards Institution, New Delhi, though not formally named a member of the Committee, has, at the invitation of the Chairman, attended all meetings and functioned as if he were a member. At the request of the Chairman and members of the Committee, he too has signed the Report.

3. *Terms of reference*. The terms of reference of the Committee are:—

(1) to draw up suitable specifications, conforming to certain basic minimum standards, for the footwear to be supplied to coal mine workers, considering the essential requirements of health and safety, the habits of the Indian miner, and the reasonableness of the cost in the light of existing economic conditions, and

(2) to examine whether the types of footwear already approved by the Department of Mines are suitable for the purpose and whether the prices charged are reasonable.

4. *Exploratory study and discussions.* As the main task of the Committee was to evolve a type of footwear most appropriate to Indian conditions, the Committee proceeded first to collect and study all available literature on the subject, including information about conditions and practices obtaining in foreign countries. In order to decide which parts of the foot or leg required protection most and what type of footwear would be capable of affording such protection, the Committee tried to secure statistics of leg and foot injuries to miners. Certain information regarding the footwear used in the British coal mining industry was also collected. In the light of such data as were readily available, the Committee considered at two meetings, held in New Delhi on the 11th September 1959 and the 21st September 1959, various problems relating to the subject, such as the type of footwear most appropriate to Indian conditions, the materials suitable for the various parts of the footwear, such as uppers, soles, etc., the approximate life of such a footwear, and the economics of the sharing of the cost by the employer and the worker.

5. *Tests and discussions in coal mines.* On the basis of these exploratory studies and discussions, the Committee got 17 pairs of footwear of different types — nine of boots and eight of shoes — manufactured by a reputed footwear manufacturer for trial under actual working conditions. The technical members of the Committee then visited three representative coal mines in the Dhanbad region and carried out certain tests on the 15th and 16th October 1959. Discussions were also held with the managements and the workers of the mines visited. These tests and discussions carried out for a day or two could naturally not be expected to yield any firm results; they could at best help the Committee to ascertain the first reactions of workers and managements to the type of footwear used. However the Committee was able to draw certain tentative conclusions even from these limited tests. The Committee also made arrangements for the continuance of the tests at one mine.

6. *Consultation with employers, workers and manufacturers.* In the light of the information so gathered, the Committee prepared draft specifications for both boots and shoes considered suitable for miners and circulated them to the all-India organizations of employers and of workers, to the main all-India organizations of manufacturers, and to the manufacturers whose samples had previously been approved of by the Chief Inspector of Mines. The specifications as well as the entire problem of footwear were later on discussed with the representatives of these bodies at a meeting of the Committee held in New Delhi on the 4th November 1959, when their advice was sought, *inter alia,* on the following specific points:—

(1) Should the footwear for miners be boots or shoes, or should a choice between these be given to workers?

(2) Would workers be able to afford socks in the near future?

(3) Should there be a steel toe cap capable of withstanding certain impacts, as in the British specifications? If so, should it be fixed outside or inside the footwear?

(4) Should soles be of rubber or of leather (with or without hobnails)? What was the life of soles made of Indian rubber as compared to that of soles made of leather?

(5) Should the uppers be of leather, rubber or canvas?

(6) Should the footwear be fitted with lace or with buckles?

(7) Would employers provide facilities for brushing and cleaning at the mines?

(8) What should be the arrangements for repairs, such as replacement of soles, heels, etc.? Would repair of rubber soles be possible in outlying areas? Would the cost of repair of soles or heels be greater in the case of rubber than in the case of leather? Would at least the bigger employers make arrangements for repairs by organising repair shops on a no-profit no-loss basis?

(9) What arrangements should be made for certifying whether particular samples of footwear conformed to the prescribed specifications or not?

(10) What would be the cost of the footwear conforming to the proposed specifications?

(11) What would be an appropriate method for the worker to make payment? Would, for example, bonus be a suitable source for meeting the cost?

(12) If the life of the footwear prescribed was more than one year and its cost so high that the worker could not be expected readily to meet half of it every year, should the terms of the Coal Award be departed from so as to provide for supply once in 18 months or so?

(13) Could anything be done to ensure that the footwear was not used by workers outside working hours in order to prevent undue wear and tear?

(14) Could the wearing of footwear be made compulsory say after two or three years?

7. At that meeting, the representatives of employers, of workers and of manufacturers, whose particulars are shown in Appendix A, made several practical and useful suggestions. After examining all these suggestions, the Committee has prepared the final specifications as in Appendix B.

8. *Adoption of report*: At its final meeting held in New Delhi on the 23rd December 1959 the Committee adopted and signed this report for presentation to Government.

II

HISTORICAL BACKGROUND

9. *Board of Conciliation*: The Board of Conciliation (Colliery Disputes) recommended in 1947 that footwear should be supplied to workers in coal mines at concessional rates. It felt that while the demand for footwear was not unreasonable, there was no case for allowing it completely free of charge to workers. Sale at concessional rates would prevent misuse of the facility and ensure that adequate care was taken of the footwear supplied.

10. *Industrial Committee meetings*: The recommendation of the Board was discussed at the second session of the Industrial Committee on Coal Mining held in September 1948. The Industrial Committee suggested the setting up of two small committees, one to go into the incidence of the cost of the footwear concession and the other to evolve, in consultation with mnaufacturers, a pattern of footwear suitable for miners. These committees recommended that to begin with certain experiments, financed from the Coal Mines Labour Welfare Fund, should be carried out in a limited number of mines. The second committee selected a pattern of boots produced by one of the manufacturers at a cost of Rs. 19 per pair.

11. The Industrial Committee on Coal Mining, at its third session held in March 1951, again discussed the subject of footwear and recommended that a pilot scheme should, in consultation with the Chief Inspector of Mines, be tried out in one of the collieries where accidents were frequent and that the cost of the scheme should be shared between workers and the Coal Mines Labour Welfare Fund on a half and half basis. By the time a suitable colliery was selected for the pilot scheme, the price of the boots had risen to Rs. 29 per pair. The high cost of the boots deterred workers from participating in the scheme, which had, therefore, to be abandoned.

12. *Coal Award*: The question of footwear was again raised by workers before the All India Industrial Tribunal (Colliery Disputes). The Tribunal directed that all manual workmen whose normal total emoluments were less than Rs. 100 per month should be supplied with one pair of footwear at a concessional rate of 50 per cent of the cost once a year, the quality and pattern of footwear being left to be decided by the management in consultation with the Chief Inspector of Mines. The concession was to come into effect from a date two years beyond the date of publication of the Award. Accordingly, supplies became due after the 26th May 1958. The workmen appealed against the Award both in regard to the quantum of the concession and the deferment of the date of first supply by two years. As the subject was not appealable and the workmen did not show any substantial question of law, the appeal was rejected by the Labour Appellate Tribunal.

13. *Coal Mines Regulations*: In the meantime, when the Coal Mines Regulations, 1957 were finalised, the Government of India took the opportunity to empower the Chief Inspector of Mines (and Regional Inspectors) to issue directives for the supply and use of footwear where it appeared to him that any person or class of persons was exposed to any undue hazard by reason of the nature of his employment. On the 20th March 1958, the Chief Inspector of Mines passed an order under these Regulations requiring all colliery owners to supply reinforced leather safety boots, on or before the 1st June 1958, to such trammers, miners, loaders, timbermen, shot firers, mazdoors and persons employed in sinking shafts as were not entitled to footwear under the Coal Award.

14. *Patterns approved and supplies made*: To discuss the pattern and quality of footwear to be supplied to workers in pursuance of these provisions, the Chief Inspector of Mines held a meeting at Dhanbad on the 25th April 1958 with the representatives of employers' and workers' associations. It appears that the representatives of workers suggested that leather boots should be supplied, but that others present felt that as workers were generally not accustomed to wearing either boots or shoes, stiff and heavy leather boots might turn out to be a source of danger rather than a means of protection in the slippery conditions often met with underground. It was also felt that as workers might not use polish or dubbin, leather boots in wet underground workings might crack rapidly and, if worn in that condition without socks, might tend to cause foot trouble. As, however, the matter was to be reviewed after one year, the representatives of workers eventually agreed that for the first year boots having hard toes and rubber sole with canvas sides might be supplied.

15. The Committee understands that during the period between the 25th April 1958, the date of the meeting held by the Chief Inspector of Mines, and the 2nd September 1959, the date on which the present Committee was set up, the Chief Inspector approved of six samples of boots from among those produced by various manufacturers. Brief particulars of the six samples are given below:—

Manufacturer	Brief description of approved sample	Date of approval by Chief Inspector	Price quoted per pair Rs. nP.
(1) Bata Shoe Co. (P) Ltd. Calcutta.	Safety boots with rubber sole, canvas sides, and aluminium toe cap.	25-4-58	12·20 (retail) and 12·35 (listed)
(2) East Jamuria Co. (P) Ltd. Calcutta.	Safety boots manufactured from canvas with rubber moulded sole and heel, and aluminium toe cap.	11-10-58	9·40 (F.O.R. Howrah)
(3) Rita Trading Co. Calcutta.	Safety boots with rubber moulded sole, heel and canvas and aluminium toe cap.	9-1-59	9·08

Manufacturer	Brief description of approved sample	Date of approval by Chief Inspector	Price quoted per pair Rs. nP.
(4) Civil and Military Equipments, Calcutta.	Safety boots made of rubber compound with hard toe.	16-1-59	13·50 (F. O. R. Howrah.)
(5) Ruby Industries, Kanpur.	Safety boots with leather sole, russet kips leather uppers and steel toe cap.	18-5-59	12·50
(6) Do.	Safety boots with leather sole chrome tanned leather uppers and steel toe cap.	18-5-59	12·50

16. Out of about 3·50 lakhs of workers employed in the coal mining industry, about 2·65 lakhs of workers are entitled to footwear under these provisions. Of these 33,840 workmen were supplied footwear up to the end of August 1959.

III

CONSIDERATIONS INVOLVED

17. *Accidents in mines*: Workers employed in coal mines are exposed to a fairly large number of accidents, causing injuries particularly to their legs and feet. It is understood from the Chief Inspector of Mines that there were 2,797 serious accidents in coal mines in 1958 and 2,678 in 1957, involving the permanent loss of, or injury to, the sight or hearing, or the fracture of a limb, or the enforced absence of the worker for more than 20 days. Of these 1,689 accidents in 1958 and 1,751 in 1957 were attributed to miscellaneous causes, a large number resulting in foot and ankle injuries caused owing to the absence of any protective footwear. Similar information is published in the Annual Reports of the Chief Inspector for earlier years also. These statistics cover only serious accidents which result in the enforced absence of the worker for more than 20 days. Workmen's compensation is, however, payable in respect of temporary disablement, total or partial, involving enforced absence for a shorter period though a waiting period of three days has been prescribed in such cases. Thus a much larger number of accidents than those indicated by the statistics given above would qualify for payment of compensation. The published data are largely corroborated by a special study made by the Chief Inspector of Mines at the instance of the Committee, which showed that during the months of June, July and August 1959, there were 736 serious injuries to workers in coal mines, out of which leg and foot injuries accounted for 239, that is roughly one-third of the total. At the request of the Committee, the Chief Inspector of Mines conducted a further special study of accidents in six fair-sized mines during the years 1956, 1957 and 1958. In these mines, which together had a daily employment of 33,532, there were during the three years a total of 426 serious accidents and 3,109 minor accidents. 142 of the serious accidents and 1,087 of the minor accidents related to the foot. These figures again show that injuries to the foot are caused by nearly one-third of all serious and minor accidents in coal mines.

18. *Incidence of hookworm*: The worker in the coal mining industry is a victim not only of accidents but of hookworm. The following statement* summarises the results of the investigations so far conducted in regard to the incidence of this disease in the coal mining industry:—

Year of investigation	Field of investigation	Number of colliery workers examined		Percentage of workers infected by hookworm	
		Under ground	Surface.	Under ground (%)	Surface (%)
1919-20	Jharia coalfields	3,020	2,436	58	50
1923.	Raniganj coalfields	3,616	731	72	53
1926.	Raniganj coalfields	12	75	92	88
1947-48	Jharia coalfields	1,112	2,037	55	49

***Indian Journal of Medical Research (January 1950) pp. 95—118**

19. The last survey conducted in 1947-48 covered samples not only of underground and surface workers but of clerical and technical personnel and even of persons engaged in non-colliery occupations. Underground colliery workers, closely followed by surface workers, showed the maximum incidence and the clerical and technical personnel, the least incidence, as the following table will show:—

Occupation	Number of persons examined	Percentage of persons infected by hookworm (%)
Colliery underground	1,112	55
Colliery surface	2,037	49
Colliery other (clerical and technical) .	267	11
Non-colliery	1,875	29

20. As clerical and technical personnel in collieries generally use footwear, this explains why the incidence of hookworm amongst them was found to be as low as 11 per cent. as against 49 per cent. amongst surface workers and 55 per cent. amongst underground workers. The report of the survey says that the use of footwear had a significant effect in reducing the incidence of hookworm and that in the entire sample those using footwear showed only 27 per cent. infection, while those not wearing footwear were responsible for a rate of 43 per cent.

21. *Object of prescribing footwear*: Coal mining is one of the more hazardous of occupations in which the worker is exposed to accidents and diseases. It was urged before the All India Industrial Tribunal (Colliery Disputes) that footwear was most essential and that apart from considerations of health and hygiene, which made footwear a bare necessity, the efficiency of workers would improve when the incidence of diseases, particularly those relating to the foot, went down. The employers did not deny that the amenity would improve the health of workers and reduce the incidence of diseases, but pleaded that workers were not used to wearing footwear. The Tribunal held that this argument, which had been repeated too often in different forms, was weak, that the wearing of footwear, particularly underground, should be encouraged, and that footwear was even more essential than clothing. The object of prescribing footwear is thus to ensure both the safety and the health of the worker. Footwear of the appropriate pattern can protect the worker from injuries to the foot—particularly to the toes caused by falling objects and to the ankles by impact against hard objects. Footwear will also afford protection against hookworm by preventing the feet from coming into constant contact with water. The object is to evolve a type of footwear which will meet both these requirements.

22. *Type of footwear appropriate*: In determining the type of footwear most appropriate for miners, the injuries that could possibly be guarded against had first to be decided, and for that purpose the Committee tried to obtain relevant statistics. Unfortunately, the statistics

available were not adequate. The Chief Inspector of Mines had, however, collected some information for the period June to August 1959 and given his opinion that statistics for a complete year would follow more or less the same trend. During these three months, there were 239 leg injuries caused by serious accidents, and their analysis according to the part of the foot injured was as follows:—

Injured part	Number of Injuries	Percentage to total number of leg injuries (%)
(1) Toe	57	23·9
(2) Ankle	25	10·5
(3) Sole	7	2·9
(4) Heel	4	1·7
(5) Above ankle	49	20·5
(6) Unclassified (including toe, ankle, sole, heel, etc.)	90	37·6
(7) Others (Multi-injuries on body including foot)	7	2·9
	239	100·0

23. According to the Chief Inspector, the unclassified injuries shown against item (6) above could reasonably be distributed amongst items (1) to (5) in the ratio of the number of injuries mentioned against these items. When this was done, it was found that about 39 per cent. of leg injuries represented injuries to the toes. Injuries to the ankle came to about 17 per cent. Injuries to the sole and heel were roughly 8 per cent. The shin and other parts of the leg accounted for about 33 per cent. This showed that if the toes, ankle, sole and heel were protected, it would be possible to guard against at least 60 per cent. of the total leg injuries.

24. Another feature of the leg injuries was that injuries to the toes were generally more serious than injuries to other parts of the leg. This is clear from the following analysis of foot injuries admitted and treated in the Central Hospital, Dhanbad, during the period June to August 1959:—

Injured part	Number of cases	Percentage to total number of cases. (%)
(1) Toe	35	57·4
(2) Shin	21	34·4
(3) Ankle	5	8·2
	61	100·0

Toe injuries represented 39 per cent. of the total leg injuries, but the percentage of toe injuries treated to the total number of injuries treated was 57·4. Apparently a larger proportion of toe injuries required active hospital treatment than other injuries. These were cases for the treatment of which there were no facilities in colliery dispensaries and must, therefore, have been the more serious ones.

25. From these statistics it would appear that, broadly-speaking, injuries to the toes are more numerous and more serious than injuries to other parts of the leg and that if the toes and the ankle, together with the sole and the heel, were protected, one would have gone a long way towards reducing the number of injuries to miners. The shin is also exposed to quite substantial injuries, but it cannot be protected unless a full knee boot is prescribed. There are difficulties even in introducing an ankle boot straightway and an option has to be given to the worker to choose between an ankle boot and a shoe for some time to come. A knee boot is, therefore, completely out of the question. Under Indian conditions, where much of the work is done manually, freedom of movement of the joints of the leg is an important factor, and it is doubtful whether a knee boot can ever become popular. At present it is not possible to protect the shin through footwear.

26. The very fact that both the toes and the ankle need protection rules out the use of slippers as a form of protective footwear. Footwear open at the heels has the double disadvantage of leaving the heels unprotected and of lending itself to entanglement under working conditions.

27. Leaving aside knee boots and slippers, the Committee has examined the suitability of ankle boots and shoes. The general opinion of wearers in all the three mines where trials were conducted was that boots were less satisfactory and that shoes would be preferred. Since most of the samples of boots were worn without socks, the wearers complained that the ankle portion rubbed against the skin and caused blisters. Another objection was that boots did not allow of free movement of the ankle when the wearer crouched in the course of working. They also said that particles of coal or coal dust getting into the footwear could more easily be removed from shoes than from boots. An important point which seems to have tilted the balance in favour of shoes was that these could be used outside the mine also.

28. The preference for shoes expressed by workers did not have the whole-hearted support of the representatives of the workers' organizations. The All India Trade Union Congress expressed the view that boots should be supplied and not shoes, and that if boots were not likely to be immediately popular, the worker could be given the option to choose between the two for some time. The Hind Mazdoor Sabha observed that boots were preferable to shoes from the point of view of preventing workers from using the footwear outside duty hours. They, however, recommended option between boots and shoes for two years. It was their view that workers, who got accustomed to shoes, would switch over to boots at the end of that period and that, with practice, boots could be worn even without socks. The Indian National Trade Union Congress remarked that not only shoes but boots would be used in off-time and that it would be very difficult to prevent such use. At the same time, their opinion was that if option between boots and shoes was not given,

most of the workers might not purchase boots unless it was made compulsory and that if option was given, it would not be difficult to switch over to boots later on.

29. The employers' organizations were of the view that it would be better for miners to cultivate the habit of wearing boots from the very beginning and that workers who got accustomed to shoes might not like to change over to boots later on.

30. These comments show that there was a substantial measure of agreement between the employers' and workers' organizations in regard to the suitability of boots as the appropriate footwear in mines and to their superiority over shoes from the point of view of safety. The Committee is of the view that the appropriate footwear for workers in mines is boots and not shoes. Protection of the ankle, which is an important consideration, is not possible with shoes. From the point of view also of exclusion of moisture, boots are preferable to shoes. Moreover, the construction of boots is ordinarily quite different from that of shoes. Much thicker and more durable varieties of leather are used for boots which are looked upon as articles meant for rough and hard wear, while shoes, with their emphasis on comfort, are generally of less substantial materials. Thus the measure of protection afforded by boots is clearly greater than that afforded by shoes even in respect of the areas of the foot covered by both.

31. The Committee is not unaware of the reasons why the majority of the wearers in trials expressed a preference for shoes. Most of our workers are unaccustomed to wearing any footwear at all. Even where something is worn, it is no more than a flimsy pair of slippers or light shoes. Persons unaccustomed to footwear will, in the beginning, naturally object to the weight of boots and to the latter restricting the movement of the ankle. It is only by constant wear over a period that these irksome factors can be overcome.

32. Boots should, therefore, be the proper footwear for eventual use in mines. But in view of the fact that workers themselves want shoes to begin with, they should be given the option, as an educative measure, to choose between boots and shoes for a preparatory period of two years. It would do no good to create a psychological resistance to footwear by prescribing the most appropriate type if it happens to be also the least acceptable for the time being. The option may be withdrawn, and boots alone retained, after the initial period. The specifications recommended in Appendix B provide accordingly for boots as well as shoes. If workers prefer boots, it should be obligatory on the part of employers to supply them. In fact employers should encourage workers to prefer boots to shoes. It is only when workers insist on shoes in preference to boots that shoes may be supplied. In order that workers may find it comparatively easy to change over from shoes to boots, both should be of the same materials and of the same construction, shoes being in all respects a replica of the lower portion of boots. The difference in price will be of the order of three or four rupees at the most, but this naturally should not be the deciding factor.

33. Normally when heavy boots are worn, socks are used, as otherwise they are likely to be uncomfortable. The Committee, however, is not sure to what extent workers will be able to afford socks in the

existing economic conditions. In order to make the footwear comfortable even without socks, and as a partial substitute for socks, a soft leather lining has been included in the specifications prescribed in Appendix B.

34. As has been pointed out elsewhere, shoes will invariably be used not only during work but during off-time. The chances of use outside working hours will be reduced when shoes are replaced by boots. This should be borne in mind while eventually evaluating the life of the footwear that is being recommended by the Committee. Enquiries into actual experience should take into account the extent to which the footwear has been used outside working hours.

35. *Toe caps*: As injuries to toes are numerous and serious in Indian mines, the Committee considers that toe caps of adequate strength are essential. This view is shared by workers' organizations also. The representative of the Hind Mazdoor Sabha stated that protection of the toes should be by a steel cap and not by an aluminium cap as had been adopted in the samples of footwear approved by the Chief Inspector of Mines. The Indian National Trade Union Congress suggested that toe caps should be fitted inside the footwear. There are certain advantages in fixing the toe cap outside, for it is the toe which bears the brunt of the many knocks and impacts to which the foot is subjected and receives most of the abrasions caused by sharp edges. But it is far more difficult to fix it outside than inside and the cost of the footwear will increase by a few rupees if the steel cap has to be fixed outside. In agreement with the views expressed by the workers' representatives, the Committee, therefore, recommends that there should be steel toe caps fitted inside, capable of resisting an impact from a blow of 100 ft. lb. in a drop test, as prescribed for a Grade II test in British Standard 953: 1952. It is considered that steel toe caps of this standard will give adequate protection against injuries to the toes.

36. Carbon steel of special quality will be required for the manufacture of toe caps. The composition and hardness of such steel have been included in Annexure 2 to the specifications given in Appendix B. It is understood that steel of this quality is available from indigenous sources. Even so, till Indian manufacture makes adequate progress, toe caps may have to be imported for some time. Steel toe caps are a costly component of miners boots, and it would be worth-while for manufacturers to obtain from employers used steel toe caps at fixed prices, so long as they have not been damaged and are still capable of meeting the prescribed test. Employers, in turn, will have to make arrangements so that toe caps are handed over to them at the mines by workers in return for a corresponding rebate in the payment to be made by workers towards the cost of the footwear supplied to them.

37. *Sole and heel*: In the first mine in which trials were conducted and in which about 1,250 workers were reported to have been supplied with safety boots with rubber sole and heel, the opinion was unanimous that footwear with leather sole and heel would be more suitable than that with rubber sole and heel. In the second mine where footwear had not been supplied, the workers were generally in favour of rubber sole and heel. They seemed to feel that rubber sole would give a better grip than leather sole on slippery ground and on rails. The workers in the third mine, where about 100 pairs of rubber soled boots had been

issued, also were of the opinion that rubber sole and heel would give a better grip; in fact this view was expressed even by workers who had not worn any footwear earlier.

38. The representatives of the Indian National Trade Union Congress and of the Hind Mazdoor Sabha spoke in favour of rubber sole, but the All India Trade Union Congress supported leather sole. The Indian Mining Association said that leather would require constant repairs. The representatives of the Bata Shoe Company, of the Civil & Military Equipments, of the East Jamuria Company, and of the Rita Trading Co., supported rubber sole and heel. The Civil & Military Equipments said that leather sole would last four to six months and rubber sole six to eight months. They added that rubber sole could be replaced two or three times, and that the footwear would then last for more than three years. The East Jamuria Company said that rubber sole was more durable and would give better grip. They, however, recommended further trials and offered to supply samples. The Rita Trading Co. was of the opinion that rubber moulded sole and heel would be better than attached sole and heel.

39. These observations show that though the manufacturers, whose samples of rubber soled footwear had previously been approved by the Mines Department, were in favour of rubber sole and heel, the workers and their representatives were not unanimous in their preference of the material for the sole and heel. In foreign countries rubber footwear is in common use in chemical factories, tanneries, and other establishments where leather is not suitable because of chemical or wet conditions. Otherwise, leather soles with hobnails are extensively used. The advantages of rubber sole and heel are that they are waterproof, noiseless and non-sparking. They can be more durable than leather if a high grade composition is used. Unfortunately superior quality rubber sole and heel of high grade composition are not currently available in the market. It is hoped that a high quality rubber sole and heel will be made available by indigenous manufacturers in the near future. The life of the rubber sole and heel readily available may not be much more than that of leather sole and heel. Moreover, the life of boots and shoes with leather soles and heels can considerably be prolonged by half soling and part repairs to heels. The construction of footwear with rubber sole and heel is such that in repairing it, half soling cannot be resorted to, and the whole of the sole and heel will have to be completely discarded and replaced by new ones. Every time such a major dismantling is done, the life of the uppers gets reduced. Thus the additional life obtained by half-soling is lost with rubber soles and heels. Repair of rubber sole and heel is also difficult. Such repair can be done only in well-organized factories and, unlike leather sole and heel, cannot be undertaken by village cobblers. Rubber sole and heel would also generate greater heat under wearing conditions.

40. Leather sole and heel (with hobnails as will be discussed in the succeeding paragraphs) are thus, on the whole, better than rubber sole and heel. Nevertheless, for some jobs like that of the trammer, which require walking or pushing up and down, it is possible that rubber sole and heel may be preferred by some workers as these will undoubtedly give a better grip on smooth sloping surfaces or on rails. Option may, therefore, be given to workers in non-gassy mines between leather sole

and heel (with or without hobnails) and rubber sole and heel, after workers have been fully informed of the difficulties of repairing rubber sole and heel. For gassy mines, however, rubber sole and heel should be the standard as it is advisable to avoid exposed steel in the form of hobnails because of the risk of sparks on dry ground.

41. *Hobnails*: In the first mine visited by the Committee, where walking conditions along the travelling road underground were easy and the average gradient was 1 in 12, preference was shown by workers for footwear without hobnails. The workers felt that with hobnails there was every likelihood of slipping on stone surfaces or while pushing trollies on rails. The management of that mine also thought that hobnails would not be suitable. Two members of the senior staff said that their own experience had been that when the sole got wet, there was always a chance of some of the hobnails falling off and that the unevenness so caused was likely to lead to difficulties in walking. On the other hand, it was surprising that none of the workers who wore footwear during trials in the third mine complained about hobnailed boots or shoes even on inclined surfaces. The Committee, however, felt that there might be difficulty in walking with hobnailed footwear in such a mine because of the difficult conditions of the travelling road and of the steepness of the incline with an average gradient of 1 in 2. When workers were questioned particularly whether they would prefer leather sole with hobnails or rubber sole, most of them said that they would prefer rubber sole as there would then be less tendency to slip. The representative of the All India Trade Union Congress said that there was no need for hobnails.

42. The objection to hobnails in the first mine, where the easy walking conditions did not justify their rejection, and the absence of any such objection in the third mine, where the difficult walking conditions might have justified their rejection, seem to suggest that slipperiness or otherwise is only one of the factors to be taken into account in arriving at a decision regarding hobnails. Even though hobnails might cause slipping on hard, smooth and sloping surfaces, this consideration hardly arises in the case of the large majority of workers who, whether working underground or on the surface, do not have to walk frequently on slopes. The workers working at the coal face and the majority of workers on the surface do not have to walk about very much. Hobnails of the correct shape, unlike the smooth and rounded ones that are so often seen in the market, can have ample gripping qualities on surfaces other than hard ones. Moreover, the great advantage with hobnails is that they greatly add to the life of the leather sole. Their replacement is easy and no difficulty is anticipated regarding supplies. They are cheap and can be easily fixed even if a few drop off. Apart from existing sources of supply, the Harness and Saddlery Factory, Kanpur, has indented for an automatic machine for the manufacture of hobnails (stud protectors), and when the machine is in operation, the Factory could manufacture hobnails of the correct size and pattern in any quantity at reasonable rates. On the whole, therefore, leather sole with hobnails would be advantageous for the majority of workers — particularly for those whose work is largely on level ground. The Committee has, therefore, recommended leather sole with hobnails as the standard for non-gassy mines. If, however, a reasonable number of workers in a non-gassy mine object to hobnails, footwear without hobnails should be supplied to them. For

gassy mines, the Committee has recommended rubber sole and heel; the question of hobnails does not, therefore, arise in their cases.

43. *Material for uppers*: In all the three mines visited by the Committee, the workers preferred leather to canvas for use as uppers. In the first mine, where about 1,250 workers had been supplied canvas boots four or five months earlier, very few were seen wearing them. Questioned about this, they said that they wore the boots only in the monsoon as they were uncomfortably warm at other times. Even a casual examination of the few boots worn by workers showed that they had rapidly deteriorated. In a number of cases the canvas was found torn at the junction of the tongue and the quarter and in some cases at the junction of the toe cap and the vamp. In the third mine also, where the management had supplied canvas boots to about 100 workers some three months earlier, the users did not seem to like them. They complained that the boots were uncomfortable and warm. Some of them had also considerably deteriorated during that period.

44. All the three workers' organizations were of the view that leather uppers should be prescribed. The representative of the Hind Mazdoor Sabha pointed out that canvas got torn and rubber became too hot inside. The Indian Mining Association said that leather would be just as hot as canvas, that it was much easier to dry canvas than leather, and that workers would not refuse canvas coated with rubber. The Indian Mining Federation said that in the initial stage, a choice might be given to the workers, to purchase footwear of either leather or canvas. Amongst the manufacturers, all the three Associations and the Rita Trading Company were in favour of leather uppers. The Agra Shoe Manufacturers' Association added that leather was better than other materials because it was porous and could breathe. The Bata Shoe Company and the East Jamuria Company preferred canvas for the reason that it was waterproof.

45. From all this evidence, it is clear that there is a large majority of opinion in favour of leather. The Committee agrees with this view and considers that leather would be by far better for uppers than either canvas or rubber. Full chrome upper leather is superior to canvas and rubber for the following reasons, namely,

(1) that it has better resistance to wear and also to water and heat;

(2) that it has a natural breathing property and can dissipate foot perspiration. It will, therefore, be comfortable and hygienic in the humid conditions found in the mines;

(3) that it is plastic by nature and will, therefore, retain its shape;

(4) that it will withstand rough use better than other materials. It can be frequently treated with dubbin and polished and will, therefore, retain the appearance and other physical properties such as water-repellency, flexibility, etc., for a longer period;

(5) that it is resistant to microbial attacks. This is not the case with canvas unless it is specially treated; and

(6) that rubber or rubberised canvas uppers may, in the course of wear in humid conditions, undergo progressive deterioration due to accelerated ageing and emit a disagreeable smell.

46. *Waterproofness*: As water is encountered in mines, the footwear prescribed has to take this into account. The representative of the Hind Mazdoor Sabha said that normally workers had to work in depths of 1½ to 2 inches of water. The Chief Inspector of Mines was of the view that though water was found in some working places, it had to be baled out before work was started and workers did not generally have to stand in water for working. They would, of course, have to step on puddles of water sometimes. There would generally be some seepage of water on roadways, and the floor might be wet.

47. If there are several inches of water in a working place, no shoes or boots, however well-constructed, can be waterproof, for water is bound to get in through the opening in the uppers. Nothing but a pair of seamless knee boots, of the type of Wellingtons used in heavy rains, will permit of working in deep water without getting wet inside. Therefore, when we talk of the waterproofness of a footwear, all that we mean is that if one steps on puddles of water from time to time or walks along roadways which have flowing water not extending up to the opening of the uppers, the footwear will not get moist inside for a certain prescribed period. There is a standard method of testing the waterproofness of footwear with reference to the creep of moisture inside under standard wetting conditions. The sole itself and its junction with the uppers will be waterproof to the extent mentioned above. This is all that is needed. Any greater degree of waterproofness can be achieved only at an uneconomically high cost. A pattern in which the sole and the heel are directly moulded on to the uppers will naturally be more completely waterproof than one in which the heel and the sole are attached. But repairs to such a type can be undertaken only by the manufacturers themselves. The Committee is recommending a type of footwear of composite construction, *i.e.*, stitched, reveted and screwed, with full chrome upper leather and waterproof sole, made up of materials of adequate thickness. This, in its opinion, will provide all the waterproofness that is necessary in actual working conditions.

48. *Laces*: The Committee at first felt that buckles might prove, to be more convenient than laces and that the inconvenience of broken and lost laces could be avoided. Accordingly, some of the samples of shoes prepared for trial in mines were fitted with strong buckles. The management of one of the mines where a trial was conducted, however, spoke against buckles on the ground that buckles would get broken or detached and that repair or replacement would be difficult. They expressed their preference for some sort of closing device with hooks or laces instead of buckles. At the meeting held on the 4th November 1959, the representative of the All India Trade Union Congress said that boots with laces should be provided. Some of the manufacturers also felt that laces would be better than buckles. The Committee agrees with this view and recommends that both boots and shoes should have laces and not buckles.

49. *Brushing and cleaning*: The underground workings of coal mines are generally muddy, wet and slushy. Leather which comes constantly in contact with water and mud will deteriorate rapidly if it is not cleaned, brushed, dried and dubbed. In the United Kingdom, the employer provides arrangements for this free of cost. In many collieries, revolving brushes have been installed and dubbin is provided. Several types of lockers provided have heating arrangements and clothes and boots left in them are automatically dried. The representatives of workers desired

that in India also employers should make arrangements for brushing and application of dubbin. The Indian Mining Association said that there would not be any difficulty in providing brushes and dubbin so that the worker could, at the end of his shift, clean his footwear and apply dubbin before going home. The Indian Mining Federation, however, expressed the view that it would be difficult for all the mines to make these arrangements. The Committee feels that all mines may not be able to provide mechanical arrangements like revolving brushes, but that all employers should be able to provide, free of charge, ordinary hand brushes in adequate numbers and dubbin, which is a cheap composition, in adequate quantities. Dubbin, which is used for the preservation of printed grain chrome upper leather consists of 25 parts of bees wax and 75 parts of castor oil, with I part of phenol added as a preservative, and costs only about Rs. 1·12 per lb. The brushes and dubbin, together with the requisite quantity of waste cotton or rags for cleaning purposes, should be kept in a room or rooms earmarked for that purpose under the charge of some responsible person or persons. The Committee also recommends that the bigger employers might provide mechanical arrangements for brushing, like revolving brushes, and preferably also for drying and warming.

50. *Repair shops*: Even the best quality footwear, when put to rough use in mines, will need repairs at regular intervals. The special difficulties in getting rubber soles and heels repaired have already been mentioned. Even in regard to leather soles and heels, the Committee feels that the ordinary village cobbler will not be adequately equipped to handle the large demand for repairs which is bound to arise when all the 2·65 lakhs of workers entitled to footwear under the Coal Award begin to get supplies and replacements regularly. Moreover the cheap materials used by the village cobbler and his primitive ways of repair are bound to shorten the life of the footwear.

51. The representative of the Hind Mazdoor Sabha stated that the difficulty of replacing rubber soles and heels could be overcome only if the employers' associations arranged to set up repair shops for groups of collieries within a radius of two or three miles. The representative of the All India Trade Union Congress said that the cost of repairs should be borne by workers. The Indian Mining Association expressed the view that it would be difficult for employers to arrange for repairs, as they were likely to get a lot of complaints. They suggested that it would be better for workers themselves to organize co-operatives for the purpose. The Indian Mining Federation also said that arrangements for repairs would have to be made on a co-operative basis.

52. As the resources, organizational as well as material, at the disposal of employers are larger than those at the disposal of workers, the Committee recommends that employers should, largely through their organizations, make arrangements for setting up repair shops at suitable centres in co-operation with workers on a no-profit no-loss basis. In due course, no doubt. workers may be able to organize repair shops on a co-operative basis. but this will not be possible for the first few years or at all places even later on. Employers may be able to enlist the support of reputed manufacturers to open repair shops at suitable centres at rates acceptable to workers. What is important is that the initiative in this matter should be taken by employers in the early stages. These shops can also sell hobnails, laces and similar articles required by workers from time to time.

The more important of the repair shops must have arrangements for repairing rubber soles and heels also. The more enterprising among them will, no doubt, tempt the more progressive among the workers to try out the advantages of wearing socks or of using high-quality boot polish.

53. Incidentally, the Chief Inspector of Mines suggested that disabled miners could be trained to repair footwear in rehabilitation centres. The All India Trade Union Congress felt that to cover the entire coalfields adequately in this manner was only a distant possibility. Even so, without prejudice to the establishment of repair shops as recommended above, the question of giving training in footwear repair to disabled miners in rehabilitation centres should be actively explored by the Coal Mines Labour Welfare Fund. The idea is an excellent one which will serve a double purpose, and hence deserves every encouragement.

54. *Arrangements for purchase and supply*: Under the Coal Award about 2·65 lakhs of workers are entitled to footwear on concessional terms. Periodic replacements are also necessary. The responsibility for both initial supply and subsequent replacements is necessarily of the employer and must remain with him. At the same time both workers and Government are vitally interested in the arrangements for purchase and supply so that workers may feel satisfied that they are being treated fairly by the employer and that they get good value for the substantial contributions they are called upon to make. As mentioned elsewhere, the worker's share of the cost will be of the order of Rs. 10 or Rs. 11 every 12 months, and it is obvious that he cannot be expected to make such a large contribution unless he feels fully satisfied with the quality of the footwear supplied to him. The physical arrangements for the procurement and supply of footwear, including the issue of tenders, the selection of samples, the timely securing of supplies, the testing of quality, the recovery of the worker's contribution and the proper fitting of the worker entail a considerable measure of responsibility. It would be difficult to ensure workers' satisfaction unless they are actively associated with the steps taken for supply. The pooling of the demands of employers must necessarily lead to greater economy and efficiency in supply. The Committee would, therefore, suggest that each employers' organization should, in concurrence with its members, pool the requirements of all its members and take steps to place bulk orders on competitive terms. If an employer does not signify his assent to such a course or is not a member of any organization, he will necessarily have to make separate arrangements for his colliery. But whether or not collective action is possible, it is necessary that in each case a joint purchase committee should be set up to take charge of all arrangements. The purchase committee should consist of the representatives of the employer or employers' organization and of the workers in equal proportion, together with a Government representative. If an employers' organization is placing orders, the workers' representatives could best be nominated by the central organizations of workers operating in coalfields. If an individual employer is making his own arrangements, the representatives of the trade unions operating in his colliery should be nominated by the respective unions. As it is the labour relations machinery which is responsible for the ensuring of the implementation of the Coal Award, the Regional Labour Commissioner or an officer designated by him should be included in these committees. The representative of the employer or of the employers' organization who is responsible for the placing of orders should sit on the committee so that

final decisions can be taken in the committee itself. It is hoped that these suggestions will commend themselves to employers and that compulsion will not be necessary at any stage in what is essentially a sound business proposition as well as an important welfare measure. In order to ensure that the purchases conform to the prescribed specifications, it would be useful to impose a condition, while placing orders for supply, that a certain percentage of the supplies will be subject to tests at the expense of the manufacturer.

55. *Arrangements for tests*: Employers will have to get samples tested at the time of acceptance of tenders. They will also have to get the prescribed percentage of bulk supplies tested in the course of the execution of the order by the supplier. Manufacturers might also like to get their samples tested and approved in preparation for the securing of orders. The Indian National Trade Union Congress desired that there should be some standing arrangements for tests, such as tests by the Government Test House, Alipore. When a standard is finally evolved by the Indian Standards Institution for miners' footwear, it would be possible for the Indian Standards Institution to grant its own Certification Mark on the goods manufactured in conformity with the relevant Indian Standard under the I.S.I. (Certification Marks) Act, 1952. Till then the Committee agrees that the Government Test House, Alipore, which is easily accessible to employers in the major coal producing areas of Bihar and West Bengal, would be the best place for getting these tests done. Special tests on toe caps will have to be conducted on the lines of the drop tests prescribed in British Standard 953 : 1952, which has already been referred to in paragraph 35. If it be found that such special tests cannot easily be carried out, it would be sufficient if the steel used conformed to the composition and hardness indicated in Annexure 2 to Appendix B.

IV

SPECIFICATIONS RECOMMENDED

56. The considerations discussed in the preceding section cover various aspects of the coal mining industry relevant to the selection of a proper type of footwear, such as the health and hygiene of the worker, his safety and comfort, his habits and the working conditions. Issues connected with the durability of the recommended footwear, the reasonableness of its cost, and other related matters will be discussed in the next section. After a careful consideration and balancing of all these points and after a detailed study of the available specifications for safety footwear prescribed for miners in other countries, the Committee has drawn up detailed specifications for both boots and shoes as in Appendix B and recommends their adoption for use in the coal mining industry. Some of the main features of the specifications are mentioned below.

57. *Description*: The boot is ankle high. Both the boot and the shoe in the respective specifications, are made from printed grain full chrome upper leather. The sole and heel are waterproof and are made of either treated leather or cleated rubber. The leather sole and heel are fitted with rustless steel toe and heel tips. The toe tip curls in front in order to prevent damage to the leather at the tip of the toe. The leather sole is also provided with hobnails, which should be of the pattern given in the appropriate diagram as soon as the manufacture of these can be arranged for. Metal toe and heel tips and hobnails are not for use in gassy mines. Even in non-gassy mines, footwear without hobnails, but with toe and heel tips, should be supplied if there is adequate demand for it. The toe is reinforced by a steel toe cap and the tongue is padded up with felt.

58. *Design*: The design of both the boots and shoes is based on the Derby pattern. In this pattern the toe is broad, and the assembly of the upper components makes it easy to put on and take off the footwear.

59. *Material*: The material mentioned in the specifications are generally available in the country. Even the toe cap can be manufactured in India though, as has been stated earlier, it may have to be imported for some time to come. The composition of the carbon steel, stipulated in the specifications for the manufacture of the toe cap, is such that given the proper heat treatment, it will acquire the hardness necessary to resist an impact of 100 ft. lbs. It is, however, important to note that unless the steel is subjected to the proper hardening treatment, its composition alone will be of no avail. It is considered that toe caps made from carbon steel of this composition will give sufficient protection against injuries to the toes. Adequate thickness has been provided for the waterproof rubber sole and the treated leather sole, which have been prescribed as alternatives for the bottom material. The boots and the shoes envisaged in the specifications will, no doubt, be heavier than those made from canvas or rubber, but there is no doubt that workers will eventually get used to this extra weight, as it is designed to give them better protection, comfort and wear.

60. *Construction*: For both boots and shoes with leather sole and heel, the specifications provide for composite construction, *i.e.*, stitched, riveted and screwed. This will make the footwear sturdy and capable of standing rough wear. The rustless metal toe and heel tips and hobnails, which add to durability, are easily replaceable. The leather sole itself will stand at least two half solings before it has to be replaced completely.

61. *Scope for further improvements*: In recommending the specifications in Appendix B and in providing for a measure of option in regard to the choice of boots or shoes, with leather or rubber soles, for a preparatory period of two years, the Committee is fully conscious of the fact that these cannot form the final word on the subject. Experience alone can tell us which is the most appropriate type of footwear for a particular purpose and whether one type is better than another. What the Committee has tried to do is to evolve a few alternative types of footwear which it feels can be tried out successfully to meet the different requirements. As the issue of shoes to workers under the Award of the Tribunal is overdue, there is great urgency for the drawing up of these specifications and it is not possible to undertake experiments lasting a long period. Any scope for effecting improvements in future on the specifications now recommended by the Committee can be considered by the Indian Standards Institution, which would, no doubt, be the most competent organization in the country to decide as to what kind of additional information and practical data should be taken into consideration to enable it to review the position in the near future and to lay down a national standard for miners' footwear.

62. As stated earlier, the trials carried out by the Committee in three mines were of a limited scope and were meant to ascertain only the first reactions of workers. The Committee, therefore, felt that it would be advantageous to have some types of footwear tried out for a further period in the third mine where the conditions of the travelling road were difficult and the average gradient was 1 in 2. Accordingly, seven pairs of different types of boots and shoes were left with the Manager of that mine for issue to seven representative workers. These workers have undertaken to wear the samples regularly, to clean them daily and to polish them occasionally. The Manager is keeping notes of the experience gained, particularly in regard to comfort, waterproofness, slipperiness, etc. A summary of the reports so far received from the Manager is given in Appendix C. Even these trials are not adequate and some modifications may be necessary based on users' reports.

V

COST AND RELATED MATTERS

63. *Life*: As mentioned earlier, the Committee noticed during its visit to the mines that a number of canvas boots with rubber sole and heel issued some time ago had become unserviceable within three or four months. The life of footwear generally depends on the life of the uppers, because so long as the uppers are good, the sole and heel can be repaired or replaced. When once the uppers become unserviceable, the footwear has to be discarded. There is general agreement that the average life of the canvas boots introduced in 1958 was only about four months.

64. At the meeting held on the 4th November 1959, the Agra Shoe Manufacturers' Association said that the soles of the samples of leather boots and shoes got prepared by the Committee for purposes of trial in the mines would last about 12 months with hobnails and six months without hobnails. The Factory Manager of the Company which manufactured them, who represented the Tanners Federation of India at the meeting, said that the life of those samples would be at least eight months without repairs and about 18 months with half soling twice.

65. It is understood that two pairs of army boots costing Rs. 16·90 per pair are supplied to soldiers every 18 months. Based on the actual experience of the use of these boots, it has been estimated that one pair of army boots, used under the conditions obtaining in the army, will last 18 months and that if two pairs are issued at the same time, their total life will be about 30 months. Even though soldiers and miners have to use their footwear only for about eight hours a day on duty, the footwear of miners is likely to be subjected to much rougher use than that of soldiers. The Committee estimates that the life of the boots and shoes conforming to the specifications recommended by it in Appendix B will be only 12 months.

66. *Cost and periodicity of supply*: At the meeting held on the 4th November 1959 the following approximate estimates of cost were made by the various manufacturers of boots and shoes conforming to the draft specifications circulated by the Committee:—

Manufacturer	Approximate cost of		Remarks
	Boots	Shoes	
	Rs.	Rs.	
(1) Ruby Industries	19	17	Welted construction.
(2) Do.	20	13	Composite construction.
(3) Civil & Military Equipments	24—26	18—20	
(4) Tanners Federation of India	25—28	21—24	Allowing for about two rupees for a pair of toe caps.

67. In the light of the approximate estimates of costs obtained from manufacturers the Committee considers that in bulk manufacture, it should be possible to get footwear conforming to the specifications described in Appendix B at approximately the following retail prices:—

	Rupees per pair
(1) Boots with leather sole and heel (with hobnails)	22.00
or	
Boots with rubber sole and heel.	
(2) Shoes with leather sole and heel (with hobnails)	19.00
or	
Shoes with rubber sole and heel.	

If hobnails are not used, the cost will be reduced by about one rupee per pair. It goes without saying that in actual competitive tendering, these rates are bound to go down to a certain extent. However, the Committee is indicating these approximate prices so that both employers and workers may know what their respective shares roughly are.

68. Under the Coal Award, one pair of footwear has to be supplied to workers once a year at 50 per cent. of the cost. In accordance with this, employers have so far spent, and workers have so far paid, about Rs. 6 per pair towards the cost of the canvas boots previously supplied. The Indian Mining Federation said that employers would not like to spend more than what they did at present, *i.e.,* 50 per cent. of about Rs. 12 per year though they admitted that the supplies previously made lasted only about four to five months and that even the improved patterns of canvas boots supplied by the manufacturers were expected to last only five to six months. The Hind Mazdoor Sabha also said that workers could not afford to pay more than Rs. 6 or so per pair, which was the amount they had been paying. The Indian National Trade Union Congress was, however, of the view that workers wanted good, cheap and durable footwear and that they would be able and willing to pay at least Rs. 10 or 12 per pair as their share.

69. When the Coal Award says that one pair of footwear should be supplied once a year, the reference obviously is to a type of footwear which, with ordinary care and maintenance, would be serviceable for a period of one year in the conditions existing in the mines. As the worker and the employer have each been paying about Rs. 6 for a pair of canvas boots expected to last about four months, it would not be unreasonable for them to pay about Rs. 10 or Rs. 11 each for a pair of sturdy footwear costing about Rs. 19 to 22 per pair.

70. With regard to the workers' share of the cost, the Hind Mazdoor Sabha said that payments might be made in instalments from bonus. The Indian National Trade Union Congress stated, however, that deductions should be made from the weekly wages of workers and not from bonus as some workers did not get bonus. Deductions from weekly wages would entail a considerable amount of accounting and is not administratively feasible. Bonus, where it is due, would on the other hand be a suitable source for meeting this cost. Where bonus is not earned, payments have necessarily to be made out of wages. Payments in half-yearly or quarterly instalments would be convenient if this can be

arranged for. The Committee would, however, leave the method of payment of the worker's share to be settled by mutual agreement between the parties. There is no merit in evolving a hard and fast rule about this.

71. In the United Kingdom, the present practice is that the first pair of footwear is given free of charge to the new entrant by the National Coal Board and that the worker pays the full cost of all replacements. At the meeting held on the 4th November 1959, the representative of the Indian Mining Association said that supplies in India might be regulated on the same pattern. Saying that leather required constant repairs, he also suggested that it would be preferable to have shoes of cheaper variety more frequently. On the other hand, the All India Trade Union Congress advocated free supply at prescribed intervals. This question, which relates to the substantive rights and relationships between the parties, is not one which comes within the terms of reference of the Committee. The Committee must proceed on the assumption that, following the terms of the Coal Award, the cost will have to be shared equally by the employer and the employee.

72. *Question of compulsory use*: Footwear has been recognised in several countries of the world as a part of the protective equipment of workers in coal mines. The Model Code of Safety Regulations for Underground Work in Coal Mines, issued by the International Labour Office in 1950, requires that "strong footwear with reinforced toe caps should be worn underground". A French Regulation of 1951 requires that "save in exceptional cases, workers shall be prohibited from travelling and working without sufficiently strong boots". In the United States, the Federal Mine Code of 1953 provides that "protective footwear shall be worn by employees, officials and others while on duty in and around a mine where falling objects may cause injury". In Germany, there is a similar Regulation of 1935 to the effect that "underground, strong head covering and strong footwear shall be worn". In India, the Coal Award, 1956 and the orders issued by the Chief Inspector of Mines under the Coal Mines Regulations, 1957 require employers to provide footwear to workers at concessional rates. There is, however, no provision at present requiring the workers to wear the footwear supplied while at work. In the first mine visited by the Committee, though about 1,250 workers had been provided with footwear, very few were seen wearing them.

73. The present habits of the Indian miner are such that one cannot be sure that all miners will immediately start wearing protective footwear at work even when comfortable types, as now recommended, are supplied. Some may prefer to use them as much outside the mine as inside. We, however, hope that they will not be tempted to sell them. The Indian Mining Federation stated that the use of footwear should not be made compulsory straightway as workers would get accustomed to footwear only gradually. The Hind Mazdoor Sabha said that the habit of proper and compulsory use could be encouraged if regular supplies and arrangements for repairs were made. They added that workers were very eager to have footwear and that it would be possible to insist on compulsory use by underground workers within a year or two if footwear could be supplied free of charge. The question of compulsion may accordingly be considered at the appropriate time, after a substantial

number of workers have got accustomed to the use of footwear. It appeared to the Committee that all workers' organizations would agree to compulsion if footwear were supplied free of cost, the worker bearing only the cost of repairs. It is for employers to consider this suggestion carefully with a view to deciding whether the accidents averted and the increased efficiency brought about by the compulsory use of footwear are not sufficient justification for incurring the additional expenditure involved.

VI

PATTERNS APPROVED BY THE MINES DEPARTMENT

74. *Suitability*: One of the terms of reference of the Committee is whether the footwear already approved by the Inspectorate of Mines is suitable for the purpose and whether the prices charged are reasonable. As mentioned earlier, three of the six samples approved by the Chief Inspector of Mines during the period April 1958 to January 1959 were canvas boots. One was of rubber compound. The other two were leather boots. It appears from the information supplied to the Ministry of Labour and Employment by the manufacturers that till about the end of August 1959, several thousands of the canvas boots had been sold but that there had been no appreciable sales of the approved patterns of rubber or leather boots.

75. The Committee's visit to coal mines showed that canvas boots had become unserviceable within three to four months in a number of cases. Manufacturers and others who were competent to express an opinion about the life of footwear were practically unanimous in their view that the canvas boots issued in 1958 would not have a life exceeding about four months or so. The Committee has also given reasons why canvas is unsuitable for the uppers. The conclusion, therefore, is that the first supply of canvas boots were not suitable for use in mines. The manufacturers have tried to improve upon their original samples. But even the improved pattern, while possibly extending the life by another month or two, would not be suitable.

76. As regards the boots made of rubber compound, the majority of opinion is that leather would be the ideal for uppers and that rubber or rubberised canvas uppers would, besides tending to make the foot hot, undergo progressive deterioration in the humid conditions obtaining in mines due to accelerated ageing and emit a disagreeable smell. These boots also were not suitable for supply to miners.

77. The leather boots approved by the Chief Inspector also did not fully come up to the specifications recommended by the Committee in Appendix B. While they might have been reasonably comfortable, their life would have been much less than the one year for which they were intended. The Committee noticed that the sole, in particular, had been weakly constructed, that though a kind of steel toe caps had been used, these were not of the approved specifications, and that these boots would not have stood the strain of the rough conditions met with in mines. The Committee feels that none of the six patterns approved by the Chief Inspector was really suitable for use in mines.

78. It is, however, only fair to add that approval of these boots was accorded by the Chief Inspector of Mines only after consultation, and in concurrence, with the representatives of employers and workers and that the main reason for preferring canvas boots was that they would be

soft and that hard and heavy types of footwear, however effective from the point of view of protection, would not have been acceptable to workers who were not accustomed to using any footwear at all. This is a consideration which is obviously relevant in the early stages of the Scheme. That is also the reason why the Committee itself is recommending shoes as an alternative to boots for the first two years.

79. *Reasonableness of price*: The prices of the six patterns of boots approved by the Chief Inspector of Mines, as furnished to the Ministry of Labour and Employment by the manufacturers, are as follows:—

Manufacturer	Brief description of approved sample	Price per pair
		Rs. nP.
(1) Bata Shoe Co. (P) Ltd., Calcutta	Safety boots with rubber sole, canvas sides, and aluminium toe cap.	12 20 (Retail). and 12 ·35 (Listed).
(2) East Jamuria Co. (P) Ltd., Calcutta.	Safety boots manufactured from canvas with rubber moulded sole and heel, and aluminium toe cap.	9 40 (F.O.R. Howrah).
(3) Rita Trading Co., Calcutta .	Safety boots with rubber moulded sole, heel and canvas and aluminium toe cap.	9 08
(4) Civil & Military Equipments, Calcutta.	Safety boots made of rubber compound with hard toes.	13 50 (F.O.R. Howrah).
(5) Ruby Industries, Kanpur .	Safety boots with leather sole russet kips leather uppers and steel toe cap.	12 50
(6) Do. . .	Safety boots with leather sole, chrome tanned leather uppers and steel toe cap.	

80. Having regard to market conditions, the Committee is satisfied that these prices are reasonable and that there is no suspicion of any dishonest attempt on the part of anybody to charge an unreasonably high rate to workers.

VII

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

81. (1) A survey conducted in the Jharia coalfield in 1947-48 showed that about 55 per cent. of underground workers, 49 per cent. of surface workers and 11 per cent. of clerical and technical staff were infected by hookworm and that use of footwear had a significant effect in reducing the incidence of hookworm.

(Paragraphs 18-20)

(2) About one third of the serious accidents in coal mines cause injuries to the leg. About 60 per cent. of leg injuries are injuries to the toes and the ankle. If, therefore, the toes, and the ankle, together with the heel and the sole, are protected, one would have gone a long way towards reducing the number of injuries to miners.

(Paragraphs 17 and 22-25)

(3) A knee boot, which would protect the shin, is out of the question in present conditions and slippers are not an adequate protective footwear.

(Paragraphs 25-26)

(4) Leather boots are the proper footwear for use in mines, but as workers are not accustomed to wearing heavy footwear and are themselves anxious to have shoes in the beginning, they should be given the option to choose between boots and shoes for a preparatory period of two years. At the end of the two year period only boots should be issued. In order that workers may find it comparatively easy to change over from shoes to boots, both should be of the same materials and constructed in the same manner, the shoes being in all respects a replica of the lower portion of boots.

(Paragraph 32)

(5) Shoes will invariably be used not only during the period of work but during off-time. This will happen much less when shoes are replaced by boots. This should be borne in mind while eventually evaluating the life of the footwear that is being recommended by the Committee. Enquiries into actual experience should take into account the extent to which the footwear has been used outside working hours.

(Paragraph 34)

(6) As workers will not be able to buy socks in the existing economic conditions, a soft leather lining should be provided as a partial substitute for socks.

(Paragraph 33)

(7) There should be steel toe caps fitted inside, capable of resisting an impact from a blow of 100 ft. lb.

(Paragraph 35)

(8) Carbon steel of special quality for the manufacture of toe caps will be available from indigenous sources. But till indigenous manufacturers take up manufacture in sufficient numbers, toe caps may have to be imported. As toe caps are of good quality steel, it would be possible to use them again after being salvaged from discarded footwear.

(Paragraph 36)

(9) Leather sole and heel (with hobnails) are better than rubber sole and heel for the majority of workers in non-gassy mines. Option may, however, be given to workers, in non-gassy mines to choose between leather sole and heel (with or without hobnails) and rubber sole and heel, after being informed of the difficulties in repairing rubber sole and heel, because, for some occupations requiring walking or pushing up gradients, rubber may give a better grip than leather on the ground.

(Paragraphs 40 and 42)

(10) Rubber sole and heel may be the standard for gassy mines, as naked steel in the form of hobnails cannot be allowed in them.

(Paragraphs 40 and 42)

(11) Leather is the best for uppers in preference to canvas or rubber.

(Paragraph 45)

(12) The footwear should be waterproof as the wearer has often to walk or work on wet ground.

(Paragraphs 46-47)

(13) Both boots and shoes should have laces and not buckles.

(Paragraph 48)

(14) The bigger employers should try to provide mechanical arrangements for brushing and cleaning like revolving brushes. Others must provide hand brushes, dubbin and cleaning rags in central places under the charge of a responsible person or persons.

(Paragraph 49)

(15) Employers should make arrangements to set up repair shops in suitable centres in co-operation with workers on a no-profit no-loss basis. These shops can also sell hobnails, laces, etc., which will be required by workers from time to time. The more important workshops must have arrangements for repairing rubber soles also.

(Paragraph 52)

(16) The question of giving training in footwear repair to disabled miners in rehabilitation centres may be explored by the Coal Mines Labour Welfare Fund.

(Paragraph 53)

(17) Each employers' organization, or each employer as the case may be, should pool all requirements and place bulk orders on competitive terms. In placing orders a condition may be imposed that a certain percentage of the bulk orders will be subject to test at the expense of the manufacturer. In each case a joint purchase committee should be set up to take charge of all arrangements for the procurement and supply of footwear including the issue of tenders, selection of samples, timely securing of supplies, testing of quality, recovery of workers' contribution and proper fitting of workers. The purchase committee should consist of representatives of the employer or employers' organization and of the workers in equal proportion together with the Regional Labour Commissioner concerned or an officer designated by him.

(Paragraph 54)

(18) The Government Test House, Alipore, which is easily accessible to employers in the major coal producing areas, may be the best place for getting samples tested. If it be found that special tests on toe caps cannot easily be carried out, it would be sufficient if the steel used conformed to the composition and hardness indicated in Annexure 2 to Appendix B.

(Paragraph 55)

(19) The specifications recommended by the Committee are in Appendix B. Any scope for effecting improvements in these specifications in future can be considered by the Indian Standards Institution.

(Paragraph 61)

(20) The life of boots and shoes conforming to these specifications will be 12 months as compared to life of about four months or so of the canvas boots introduced in 1958.

(Paragraph 65)

(21) The approximate price of shoes and boots conforming to these specifications is estimated at about Rs. 19 and Rs. 22. When tenders are invited, a more favourable rate may be obtained as a result of competition.

(Paragraph 67)

(22) It would not be unreasonable to expect employers and workers to pay about Rs. 10 or Rs. 11 each for a pair of sturdy footwear costing about Rs. 19 to Rs. 22.

(Paragraphs 68-69)

(23) Bonus, where it is due, might be a suitable source for meeting the workers' share of the cost. Where bonus is not due, recoveries may, if possible, be made in quarterly or half-yearly instalments. This must, however, be left for adjustment between employers and workers.

(Paragraph 70)

(24) The question whether the use of the approved pattern of footwear should be made compulsory may be examined at a future time after a substantial number of workers have got accustomed to the use of footwear.

(Paragraph 73)

(25) None of the six patterns of boots approved by the Mines Inspectorate in the past was suitable for use in mines. There was, however, some justification for selecting such types, as hard and heavy boots might have proved unacceptable to workers.

(Paragraphs 77-78)

(26) The prices of the boots approved by the Mines Inspectorate were not unreasonable.

(Paragraph 80)

VIII

ACKNOWLEDGMENT

82. The Committee wishes to place on record its gratitude to the managements of the mines which provided facilities for the tests, to the workers in those mines who willingly came forward to carry out the tests, and to the representatives of employers, workers and manufacturers who responded to the Committee's invitation and made very practical and useful suggestions.

83. It also thanks the Chief Inspector of Mines for giving it the benefit of his vast experience and for arranging for tests in the various mines.

84. The Committee also places on record its great appreciation of the hard work done by its Secretary, Shri A. P. Veera Raghavan, whose meticulous care in carrying out every suggestion made by the Committee and in drafting the Report was of great assistance to the Committee.

K. N. SUBRAMANIAN, *Chairman.*

N. S. MANKIKER, *Member.*

P. C. AHLUWALIA, *Member.*

D. N. SEN, *Member.*

SADGOPAL

A. P. VEERA RAGHAVAN, *Secretary.*

NEW DELHI

The 23rd December 1959.

IX

APPENDICES

APPENDIX A

MINERS' BOOTS COMMITTEE

Meeting held in New Delhi on the 4th November 1959.

List of persons present

1. Shri K. N. Subramanian, I.C.S., Joint Secretary to the Government of India, Ministry of Labour and Employment .	*Chairman*
2. Shri N.S. Mankiker, Chief Adviser Factories	*Member*
3. Shri P.C. Ahluwalia, Works Manager, Harness and Saddlery Factory, Kanpur	*Member*
4. Shri D. N. Sen, Control Officer, Chief Inspectorate of Textiles and Clothing, Kanpur	(Co-opted)
5. Shri A.P. Veera Raghavan, Under Secretary to the Government of India, Ministry of Labour and Employment . .	*Secretary*

By Invitation

Government	
6. Dr. Sadgopal, Deputy Director (Chemicals) . . .	Indian Standards Institution
7. Shri S.S. Grewal	Chief Inspector of Mines
8. Shri T. N. Dar, Deputy Manager (Marketing) . . .	National Small Industries Corporation
Employers' Organizations	
9. Shri D. Hogg, M/s. MacNeill & Barry Ltd. . . .	Indian Mining Association
10. Shri Shew Bhagwan Goenka, Vice-Chairman	Indian Mining Federation
Workers' Organizations	
11. Shri S. Das Gupta, Secretary, Colliery Mazdoor Sangh .	Indian National Trade Union Congress
12. Shri S. K. Rudra, Colliery Mazdoor Congress . . .	Hind Mazdoor Sabha
13. Shri Kalyan Roy, General Secretary, Indian Mine Workers' Federation	All India Trade Union Congress
Manufacturers	
14. Shri Akshaiber Singh, Shoe Factory Manager, Cooper Allen Branch	Tanners Federation of India
15. Shri H.C. Diwan, Hony. General Secretary . . .	Agra Shoe Manufacturers Association

16. Shri Gur Saran Das, Manager	Dayalbagh Shoe Manufacturers Co-operative Society Ltd.
17. Shri G. Hollington, Production Manager	Bata Shoe Company (Private) Ltd.
18. Shri Dilip Chowdhury, Technical Adviser	Civil & Military Equipments
19. Shri B.S. Nahar, Proprietor	Rita Trading Company
20. Shri G.P. Tantia, Secretary	East Jamuria Company (Private) Ltd.
21. Shri S.K. Munshi, Technical Adviser	
22. Shri H. K. Bhaumik, Proprietor	Ruby Industries.
23. Shri S.D. Kapoor	

(NOTE: The Small Scale Industries, the Indian Colliery Owners Association, the Madhya Pradesh Mining Association, and the National Coal Development Corporation were invited to the meeting ; but they did not attend.)

APPENDIX B

SPECIFICATIONS RECOMMENDED

I

SPECIFICATIONS FOR PROTECTIVE BOOTS FOR MINERS

1. *Scope*

1.1. This specification prescribes the requirements of protective boots for use by miners.

2. *Description*

2.1. The boot described in this specification is ankle high and is made from printed grain chrome upper leather and waterproof sole (either treated leather or rubber). The toe is reinforced by steel toe cap and the tongue is padded up. The leather sole and heel are fitted with rustless metal toe and heel tips (also called plates). Each boot having leather sole is also further reinforced with 13 rustless hobnails, if required by the purchaser.

3. *Materials*

3.1. *Upper leather*: Chrome tanned printed grain upper leather, cow, calf or young buffalo, conforming to I.S.I. specification No. IS: 578—1954.

3.1.1. The shade of the upper leather shall be as previously agreed to between the purchaser and vendor and approved by the former.

3.2. *Lining material*:

3.2.1. Leather vegetable tanned, cow, calf, sheep or goat skin of good quality for the vamp.

3.3. *Bottom material*:

3.3.1. Vegetable tanned leather for bottom components shall be well tanned and compressed buffalo leather, conforming to I.S.I. specification No. IS: 579—1954. The outer sole leather shall be further treated by wax-oil mixture to impart waterproofness. (A typical oil wax composition is indicated at Annexure I).

3.3.2. Moulded rubber sole and heel of good quality, which shall be durable in wear and give satisfactory grip on the rocky surface with steep gradient. For guidance, a typical design of rubber sole and heel is illustrated in diagram 7.

3.3.3. The type, quality and shade of the sole shall be as agreed to between the purchaser and vendor and previously approved by the former.

3.4. *Threads*:

3.4.1. *Upper closing*. Thread linen 3 cord No. 18, 5 cord No. 18 and 3 cord No. 50.

3.4.2. *Bottom stitching*: Thread linen 10 cord No. 18 and 12 cord No. 18.

3.5. *Steel toe cap*: Moulded toe cap made from high tempered carbon steel sheet conforming in respect of impact test to the British Standards Institution specification No. 953 of 1952 Grade II and in respect of composition and hardness to Annexure 2. In the absence of facilities for the impact test in accordance with the British Standards Specification, steel toe cap conforming to the requirements of Annexure 2 shall be considered acceptable. The shape and design of the steel toe cap shall be according to diagram 5.

3.6. *Tape*: Cotton tape ¾" (19 mm) or drill strips ¾" turned in at the edges.

3.7. *Bottom filling material*: Tarred felt or cork sheet or any other suitable material such as gummed or tarred newar or durry which do not crumble or shift during use.

3.8. *Eyelets*: Brass or brass coated steel eyelets for boots, jappaned or otherwise coated to a shade, matching the colour of the upper leather.

3.9. *Toe compound*: Cement and gum compound.

3.10. *Rivets*: Brass ½" (12.5 mm), $\frac{9}{16}$" (14.3 mm) and ¾" (19 mm) spear pointed.

3.11. *Screw wire*: Brass No. 2 in accordance with the details given at Annexure 3.

3.12. *Heel pin*: Iron rustproofed 1⅛" (29 mm).

3.13. *Laces leather*: 34" (86 cm) in length, ⅙" (4.2 mm) in width and 1.75 mm to 2.0 mm in thickness, made from well fat liquored and well dubbined chrome tanned leather, matching the colour of the boot upper. The average breaking strength of the laces (between 24" grip) shall be not less than 45 lbs. and the colour of laces shall be fast to wet rubbing.

3.14. *Shank*: Iron shank properly moulded, free from rust and sharp edges.

3.15. *Heel tip and toe tip*: Steel, rustproofed in accordance with Annexure 4 and diagram 6.

3.16. *Heel tip nail* ⅞" (21*mm*) *and toe tip nail* ¾" (19 *mm*): Steel rustproofed and in accordance with diagram 6.

3.17. *Lasting tacks*: Iron (8 mm) and ½" (12.5 mm) rustproofed.

4. *Components*

4.1. Each component of the boot (see diagrams 1 and 2) shall comply with the following requirements:—

S. No.	Component	Material	Thickness	
			Min.	Max.
(i)	Vamp	Prime part of side cow or young buffalo.	1·50 mm	1·75 mm
(ii)	Quarters	Remaining best portion of side, cow or young buffalo.	1·75 mm	2·50 mm
(iii)	Toe cap and outside counter with jug loop and strengthening pieces.	Do.	1·25 mm	1·75 mm
(iv)	Full bellows tongue and seat sock.	Remaining portion of leather, soft and pliable.	0·75 mm 1·00 mm	1·00 mm 1·25 mm
(v)	Vamp lining	Cow, calf, sheep or goat leather	1·00 mm	1·25 mm
(vi)	Tongue lining	Raised woollen cloth	Weight 12 ozs/sq.yd.	
(vii)	Insole	Well struck and rolled shoulders.	6 Irons	7 Irons
(viii)	Through middle sole	Do (For boots having leather outersoles).	7 Irons	8 Irons
(ix)	Through middle sole	Do. (For boots having rubber outersoles).	4 Irons	5 Irons
(x)	Outersoles	Prime part of bend treated for waterproofness.	8 Irons	9 Irons
(xi)	Moulded rubber sole and heel.	As per quality and design previously approved.		
(xii)	Lifts and split lifts	Compressed bellies	5 Irons	8 Irons
(xiii)	Stiffeners	Well struck shoulders and bellies.	4 Irons	5 Irons
(xiv)	Tip fillings	Prime part of bend treated for waterproofness.	7 Irons	8 Irons
(xv)	Shanks	Steel shank	Previously approved	
(xvi)	Steel toe cap	Steel	Previously approved.	

5. *Construction*

5.1. The protective boots for miners shall be made to the pattern shape and design shown in diagram 1 or 2. The construction shall be by composite method *i.e.*, riveted stitched and screwed. The boots shall be made on well fitting broad toe lasts previously approved by the purchaser. Lasts taken from model No. 10883, as used for army boots which cater for various foot widths in the same size are recommended.

5.2. Prior to commencing supplies the vendor shall tender to the purchaser a pair of boots for approval.

5.3. *Manufacture*:

5.3.1. The various components of the boots shall be cut to the thickness, shape and design as required.

5.3.2. The upper components, specially the vamps and tongues shall be properly skived.

5.3.3. The upper shall be closed on lock stitch machines, the counter, back and tongues with linen thread 3 cord No. 18, sides and toe caps with 5 cord No. 18 taping with 3 cord No. 50. The number of stitches shall be 7 to 8 per inch. There shall be two rows ⅛″ (3 mm) apart on the toe caps and counters and two rows ¼″ (6 mm) apart on the sides. All loose ends of stitching threads shall be properly secured.

The tongue shall be full bellows and so fitted that wrinkles do not appear where it is joined with the vamp. A layer of raised woollen cloth shall be stitched to the flesh side of the tongue to act as a cushioning padding.

Six eyelets shall be fitted in each facing. Each eyelet shall be properly clenched without distortion.

The counter shall be turned over to within ½″ (12 mm) of the top of the leg so as to form a jug loop, as shown in diagrams 1 and 2. The top of the quarters shall be reinforced by stitching a one inch (25 mm) wide leather strip at the back.

The back seams shall be reinforced by stitching a ¾″ (19 mm) wide cotton tape or drill strip over the back seams.

5.3.4. The heel stiffener shall be reinforced with cement toe compound to make it hard and strong. The steel toe cap shall be premoulded to the exact shape and contour of the last. The edges of the steel cap shall be free from sharp points or burrs.

All bottom components shall be properly prepared and moulded before use. The insoles shall be properly feathered and shall be lightly buffed on the grain side. The outer leather soles shall be open channeled.

The outer sole may be pieced under the heel provided the joint shall not be less than one inch (25 mm) behind the breast of the heel. The piece sole shall be of the same quality as the sole and of corresponding thickness.

In the case of a leather soled boot the heel shall consist of whole cut or two pieced lifts, one split lift and tip filling complete with metal heel tip. The tip filling shall be attached by ¾″ (19 mm) spear pointed brass rivets and the tip heel by rustless heel tip nails long (22 mm).

5.3.5. The uppers shall be tightly laced up to the 4th eyelet before lasting so that the quarters meet on the instep. Prior to the insertion of the steel toe cap the upper shall be pulled over and the vamp lining lasted to the insole. The protective steel toe cap shall then be positioned and firmly secured to the insole. The boots shall be properly lasted so that the uppers are properly embedded to the last. In order to ensure a firm attachment of the uppers to the insole, a clear half inch lasting allowance all round the upper shall be provided. The stiffener shall not be cut short in any way but shall come adequately under the lasting. The lining shall be properly cleared during lasting. The boots shall remain on the lasts for a minimum period of twenty-four hours.

A metal shank shall be fitted to the waist of the insole. The bottom shall be filled with tarred felt or sheet cork or other suitable material previously approved.

5.3.6. The full leather middle soles shall be attached by means of ½" (12 mm) long rivets at the rate of four rivets per inch. All rivets shall be properly clenched to the insoles.

All stitching threads for sole sewing shall be properly waxed before use.

5.3.7. The attachment of the soles and heels of rubber and leather soled boots shall be as follows:—

5.3.8. *Boots with leather soles and heels*: The leather sole shall be securely stitched with the middle sole in an open channel by the lock stitch method using 10 and 12 cord linen thread for machine made boots and 10 cord thread for hand made boots. The number of stitches shall be 5—6 per inch (2—3 per cm). The loose ends of all stitching threads shall be secured.

The outersole shall be screwed all round by means of brass screw wire No. 2 spaced one inch apart. The screw wire shall penetrate all the bottoming layers and shall be clenched properly to the insole.

The built up moulded and compressed heel shall be securely attached by means of 12 heel pins 1⅛" long (29 mm) from the inside by machine or hand.

5.3.9. *Boots with rubber soles and heels*: The rubber sole shall be positioned on top of the middle sole and securely stitched with the middle sole in an open channel by the lock stitch method using 10 and 12 cord linen thread for machine made boots and 10 cord linen thread for hand made boots. The number of stitches shall be 5—6 per inch (2—3 per cm). The loose ends of the stitching threads shall be secured.

The rubber heel shall be securely fixed by a suitable number of 1⅛" (29 mm) heel pins from the outside, a leather lift being positioned in between the rubber sole and the rubber heel prior to attachment if and when required.

5.4. *Finishing applicable to both leather and rubber soled boots*: The height of the heel when finished shall be 1⅛" to 1¼" (29 mm to 32 mm) and the heel shall be in proper alignment with the tread of the sole.

The sole and heel edges of leather soled boots shall be carefully trimmed, scoured and set black or brown as required to give a smooth finish.

The sole and heel edges of the rubber soled boots shall be scoured and finished smooth.

The upper shall be finished bright by polishing to give an attractive appearance.

A seat sock shall be provided with every boot and shall be firmly pasted.

All boots with leather soles shall be fitted with a rustproof metal toe plate and by toe tip nails. 13 hobnails shall be fitted in each boot if required.

A pair of leather laces previously approved shall be provided with each pair of boots.

5.5. Each boot shall be legibly and indelibly marked with the manufacturer's name or recognised trade mark at the waist of the insole. The size and fitting number shall be marked on the waist of the outer sole.

5.6. In appearance, general workmanship and finish and in all other respects not defined in this specification the boots shall be equal to the approved sample.

II

SPECIFICATIONS FOR PROTECTIVE SHOES FOR MINERS

1. *Scope*

1.1. This specification prescribes the requirements of protective shoes for use by miners.

2. *Description*

2.1. The shoe described in this specification is in Derby design with 4 eyelets and is made from printed grain chrome upper leather and waterproof sole (either treated leather or rubber). The toe is reinforced with steel toe cap and the tongue is padded. The shoe is lined throughout. The leather sole and heel are fitted with rustless metal toe and heel tips (also called plates). Each shoe having leather sole is also further reinforced with 13 rustless hobnails if required by the purchaser.

3. *Materials*

3.1. *Upper leather*: Chrome tanned printed grain leather, cow, calf or young buffalo conforming to ISI specification No. IS : 578–1954.

3.1.1. The shade of the upper leather shall be as previously agreed to between the purchaser and the vendor and approved by the former.

3.2. *Lining material*: Leather vegetable tanned cow, calf, sheep or goat skin of good quality.

3.2.1. *Cotton drill for the vamp* (with a minimum B.S. of 450 lbs. in the warp direction and 250 lbs. in the weft direction in 6 width between 4″ grip).

3.3. *Bottom material*

3.3.1. Vegetable tanned leather for bottom components shall be well tanned and compressed buffalo leather, conforming to ISI specification No. IS : 579–1954. The outer sole leather shall be further treated by wax oil mixture to impart waterproofness. A typical oil-wax composition is indicated at Annexure 1.

3.3.2. Moulded rubber sole and heel of good quality, which shall be durable in wear and give satisfactory grip on steep, rocky surface. For guidance, a typical design of rubber sole and heel is illustrated in diagram

3.3.3. The type, quality and shade of the sole shall be as agreed to between the purchaser and the vendor and previously approved by the former.

3.4. *Threads*

3.4.1. *Upper closing*: Thread linen 3 cord No. 50 and 3 cord No. 18.

3.4.2. *Bottom stitching*: Thread linen 8 cord No. 18 and 10 cord No. 18.

3.5. *Steel toe cap*:

Moulded toe cap made from high tempered carbon steel sheet conforming in respect of impact test to the British Standards Specification No. 953 of 1952 Grade II test and in respect of composition and harness to Annexure 2. In the absence of facilities for testing the impact test in accordance with the British Standards Specification, steel toe cap conforming to the requirements of Annexure 2 shall be considered acceptable. The shape and design of the steel toe cap shall be according to diagram 5.

3.6. *Tape*: Cotton tape ¾" (19 mm) or drill strips ¾" (19 mm) turned in at the edges.

3.7. *Bottom filling material*: Tarred felt cork sheet or any other suitable material such as gummed or tarred newar or durrie which does not crumble or shift during use.

3.8. *Toe compound*: Cement and gum compound.

3.9. *Rivets*: ½" (12 mm) and ¾" (19 mm) spear pointed.

3.10. *Heel pins*: Iron, rustproofed 1" (25 mm).

3.11. *Eyelets*: Brass or brass coated steel eyelets jappaned or otherwise coated to a shade matching the colour of the upper leather.

3.12. *Screw wire*: Brass No. 2 in accordance with the details given at Annexure 3.

3.13. *Shank*: Iron shank properly moulded free from rust and sharp edges.

3.14. *Toe tip, heel tip, nail toe tip ¾" (19 mm) and nail heel tip ⅞" (21 mm)*: Steel, rustproofed and in accordance with Annexure 4 and diagram 6.

3.15. *Hobnails.* Steel rustproofed in accordance with diagram 5.

3.16. *Laces fabric*: Cotton, black or brown matching the colour of the upper having a length of 23"±1". The laces shall have a minimum breaking strength of 80 lbs. between 7" grip.

4. *Components*

4.1. Each component of the shoe (see diagrams 3 and 4) shall comply with the following requirements:—

S. No.	Component	Material	Thickness	
			Min.	Max.
(i)	Vamp . . .	Prime part of side cow or young buffalo.	1·5	1·75 mm
(ii)	Quarters . . .	Remaining best portion of side cow or young buffalo.	1·5 mm	1·75 mm
(iii)	Back Strap . . .	Remaining portion of the leather.	1·00 mm	1·5 mm

S.No.	Component	Material	Thickness	
			Min.	Max.
(iv)	Tongue	Remaining portion of the leather.	0·75 mm	1·00 mm
(v)	Vamp & quarter lining	Cow, calf, sheep or goat leather	0·75 mm	1·00 mm
(vi)	Seat sock	Do.	0·75 mm	1·00 mm
(vii)	Tongue lining	Raised woollen cloth	Weight 12	ozs/sq. yd.
(viii)	Insole	Well struck & rolled shoulder	6 Irons	7 Irons
(ix) (*a*)	Full middle sole	Do. (For shoes having leather outersole).	5 irons	6 irons
(b)	Full middle sole	Well struck and rolled shoulder (For shoes having rubber soles and heels).	3 Irons	4 Irons
(x)	Outer sole	Prime part of bend, treated for waterproofness.	8 Irons	9 Irons
(xi)	Tip filling	Do.	7 Irons	8 Irons
(xii)	Moulded rubber sole and heel.	As per quality and design previously approved.		
(xiii)	Lifts and split lifts	Compressed bellies	5 Irons	8 Irons
(xiv)	Stiffener	Well struck shoulder or belly.	4 Irons	5 Irons
(xv)	Steel toe cap	As previously approved.	..	..
(xvi)	Shank	Steel shank previously approved.	..	..
(xvii)	Hobnails	Steel previously approved.	..	..

5. *Construction*

5.1. The protective shoes for miners shall be made to the pattern, shape and design as illustrated in diagrams 3 and 4. The shoes shall be made on well fitting broad toe lasts previously approved by the purchaser. Lasts taken from model No. 10883 as used for army boots which cater for various foot widths in the same size, are recommended.

5.2. Prior to commencing supplies the vendor shall tender to the purchaser a pair of shoes for approval.

5.3. *Manufacture*: The method of construction shall be by the composite method.

5.3.1. The various components of the shoes shall be cut to the thickness, shape and design as required. The vamp and tongue shall also be in one piece. All upper components shall be properly prepared, including skiving and beading, as necessary.

5.3.2. The upper shall be machine closed with lock stitches using linen thread 3 cord No. 18 and 3 cord No. 50. The number of stitches shall be 10—12 per inch (4·5 per cm). There shall be one row of stitches on the quarters, back strap and tongue and two rows on facings all with 3 cord No. 50 and three side rows with 3 cord No. 18. All loose ends of the stitching threads shall be properly secured. All threads for welt and sole stitching shall be properly waxed before use. The quarters shall be lined with leather, the vamp with drill, and the tongue with raised woollen cloth. Four eyelets shall be fitted in each facing, each eyelet being properly clenched without distortion.

5.3.3. The prepared heel stiffener shall be reinforced with cement toe compound to make it hard and strong. The steel toe cap shall be pre-moulded to the exact shape and contour of the last. The edges of the steel toe cap shall be free from sharp points or burrs.

The bottom components shall be properly prepared and moulded before use. The insoles shall be feathered and the outersoles channelled. The insoles may be lightly buffed on the grain side if required.

Prior to inserting the steel toe cap the upper shall be pulled over and the vamp lining lasted to the insole. The protective steel toe cap shall then be positioned and firmly secured to the insole. The upper shall then be properly lasted to ensure a snug embedding of the uppers to the last and at least a half inch lasting allowance shall be provided all round the upper. The upper linings shall be properly cleared all round. The shoes shall remain on the last till they are perfectly dry and the toe and stiffeners are set hard and strong. A steel shank shall be fitted to support the waist, and the bottom properly filled with the bottom filling material previously approved.

5.3.4. The making operations for different types of construction shall be as follows:

5.3.5. *Composite construction with leather outersole and heel:*

The full leather middle sole shall be riveted means of ½″ (12 mm) spear pointed brass rivets, at the rate of four rivets to the inch.

The outer sole shall then be stitched in an open channel with the middle sole using thread linen 8 cord and 10 cord for machine stitching and 10 cord for hand stitching, and further reinforced by means of brass screw wire No. 2, spaced one inch apart all round. The stitches shall not be less than 5 nor more than 6 per inch (2·3 per cm).

A piece sole may be used provided the joint is positioned at least one inch (25 mm) behind the breast of the heel. The soles shall be properly levelled.

It shall be ensured that all rivets and screws penetrate all the bottoming layers and are properly clenched to the insole.

The leather heel shall consist of two to three whole cut lifts, one split lift, one tip filling complete with metal heel tips and shall be properly pre-moulded and compressed. The tip filling shall be attached by means of ¾″ (19 mm) brass rivets and the heel tip by means of heel tip nails. The heel shall then be attached by means of 12 heel pins, one inch long (25 mm) from the inside in case of machine made shoes and for hand made shoes the heel shall be fixed from outside by a minimum of 14 heel pins which shall be further reinforced from the inside by 4—6 heel pins.

5.3.6. *Composite construction with rubber sole and heel:*

The through middle shall be riveted all round, at the rate of 4 rivets to the inch (25 mm).

The rubber outersole shall be positioned on top of the leather middle and stitched using 8 and 10 cord linen thread for machine sewing and 10 cord linen for hand stitching. The number of stitches shall be 5-6 per inch.

The rubber heel shall be securely attached using a suitable number of one inch (25 mm) long heel pins from the outside, using a whole cut leather lift placed in between the rubber heel and the rubber sole, if and when required.

5.4. *Finishing (Applicable to all constructions)*

The height of the heel when finished shall be one inch (25 mm). The heel shall be in proper alignment with the tread of the sole.

The sole and heel edges of leather soled shoes shall be carefully trimmed, scoured and set black or brown as required to give a smooth finish. The sole and heel edges of rubber soled shoes shall be scoured and finished smooth.

The upper shall be finished bright by polishing to give an attractive appearance.

A seat sock shall be provided for all shoes. Each shoe shall be supplied with a fabric lace equal in quality to that used in the approved sample.

All shoes having leather sole shall be fitted with a rustproof metal toe plate by toe tip nails. Each shoe shall also be fitted with 13 hobnails, if required by the purchaser.

5.5. Each shoe shall be legibly and indelibly marked with the manufacturer's name or recognised trade mark at the seat sock. The size and fitting number shall be marked on the waist of the outersole.

5.6. In appearance, general workmanship and finish and in all other respects not defined in this specification, the shoes shall be equal to the approved sample.

ANNEXURE 1

COMPOSITION OF OIL WAX MIXTURE FOR IMPARTING WATERPROOFNESS TO VEGETABLE TANNED SOLE LEATHER

Mineral oil, BOC 108	4 parts
Bees wax	1 part
Paraffin wax	1 part
Rosin	½ part

Melt the above wax-oil composition and bring it to a temperature of 140°F. Into the molten mixture at 140°F dip the dry cut soles and keep them immersed for 15 to 20 minutes. Take out the soles, allow them to strain and cool overnight, keeping them in a vertical position. Slicker away the excess grease from the surface.

ANNEXURE 2

COMPOSITION AND HARDNESS OF STEEL FOR THE STEEL TOE CAP

The medium carbon steel for the steel toe cap shall conform to the following requirements:

(i) *Composition*

The medium carbon steel shall consist of the following ingredients in the proportion by weight:

Carbon	0.55 to 0.65%
Manganese	0.52 to 0.80%
Sulphur	0.05% maximum
Phosphorus	0.05% maximum
Silicon	0.1 to 0.35%

(ii) ***Hardness***

450 to 500 VPN at a load of 10 Kilograms.

(iii) *Thickness*

The thickness of the steel sheet shall be 0.0625″ to 0.0670″ (16 BG to 17 BG).

ANNEXURE 3

REQUIREMENTS OF BRASS SCREW WIRE

Metal	Diameter	Depth of thread	Angle of thread	No. of threads per inch	Hardness at 10 kilos
	'A'	'B'	'C'		
Brass	0·9 -1·00 in.	0·0115–0·0118 in.	95°—98°	20	185—200 V.P.N.

The details 'A', 'B' and 'C' are shown in diagram 8

Practical test

The screw wire shall not break when bent at an angle of 90° repeatedly for four times.

ANNEXURE 4

SIZE OF HEEL AND TOE TIPS

Boot/Shoe sizes	Tips toe sizes	Tips heel sizes
3 to 5	$2\frac{3}{4}''$	$2\frac{7}{8}''$
6 to 7	$2\frac{7}{8}''$	$3''$
8 to 9	$3''$	$3\frac{1}{8}''$
10 to 11	$3\frac{1}{8}''$	$3\frac{1}{4}''$

BOOTS, MINERS, PROTECTIVE.
(WITH LEATHER SOLE)

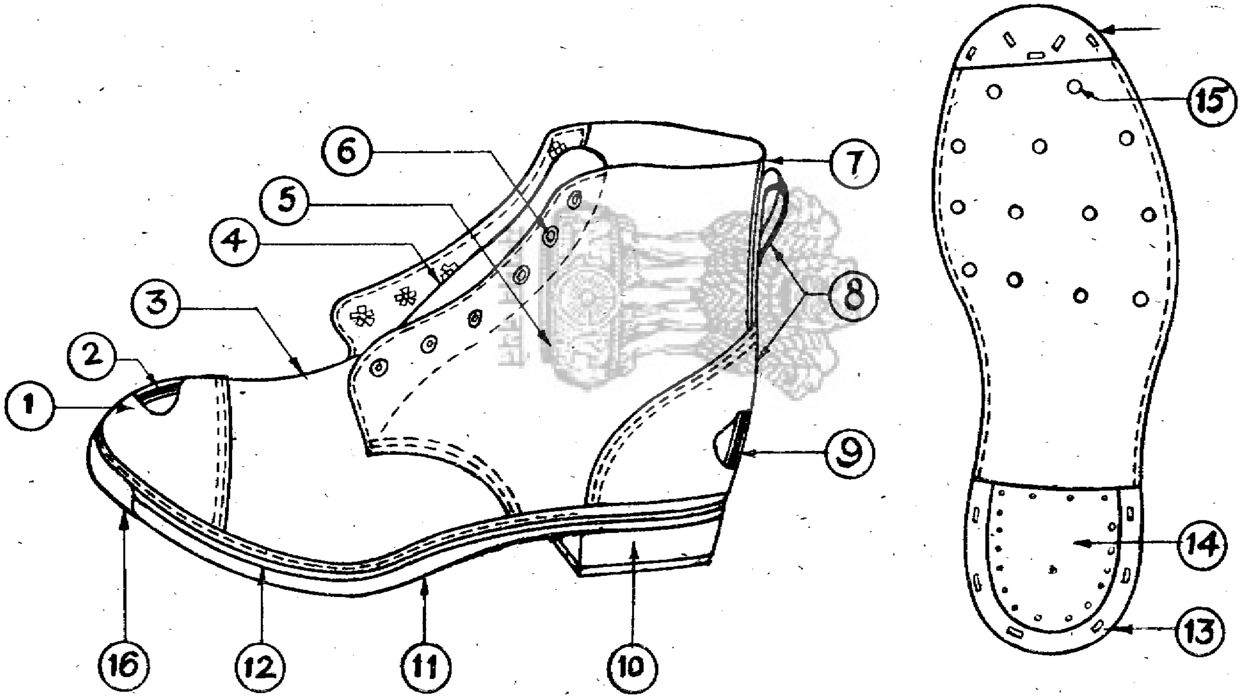


DIAGRAM I.

COMPONENTS OF BOOTS MINERS PROTECTIVE
(WITH LEATHER SOLE)

① TOE CAP.
② STEEL TOE CAP.
③ VAMP.
④ FULL BELLOWS TONGUE.
⑤ QUARTERS.
⑥ EYELETS.
⑦ STRENGTHENING PIECE.
⑧ OUTSIDE COUNTER WITH LOOP.
⑨ STIFFENER (LEATHER)
⑩ HEEL.
⑪ OUTER SOLE.
⑫ MIDDLE SOLE.
⑬ HEEL TIP METAL.
⑭ TIP FILLING (LEATHER)
⑮ HOB NAILS.
⑯ TOE TIP METAL.

SEAT SOCK.
INSOLE.
SHANK.
BOTTOM FILLING
LIFTS & SPLIT LIFTS
VAMP LINING.
TONGUE LINING.
} NOT VISIBLE

LEATHER LACE--------NOT SHOWN

BOOTS, MINERS, PROTECTIVE.
(WITH RUBBER SOLE AND HEEL)

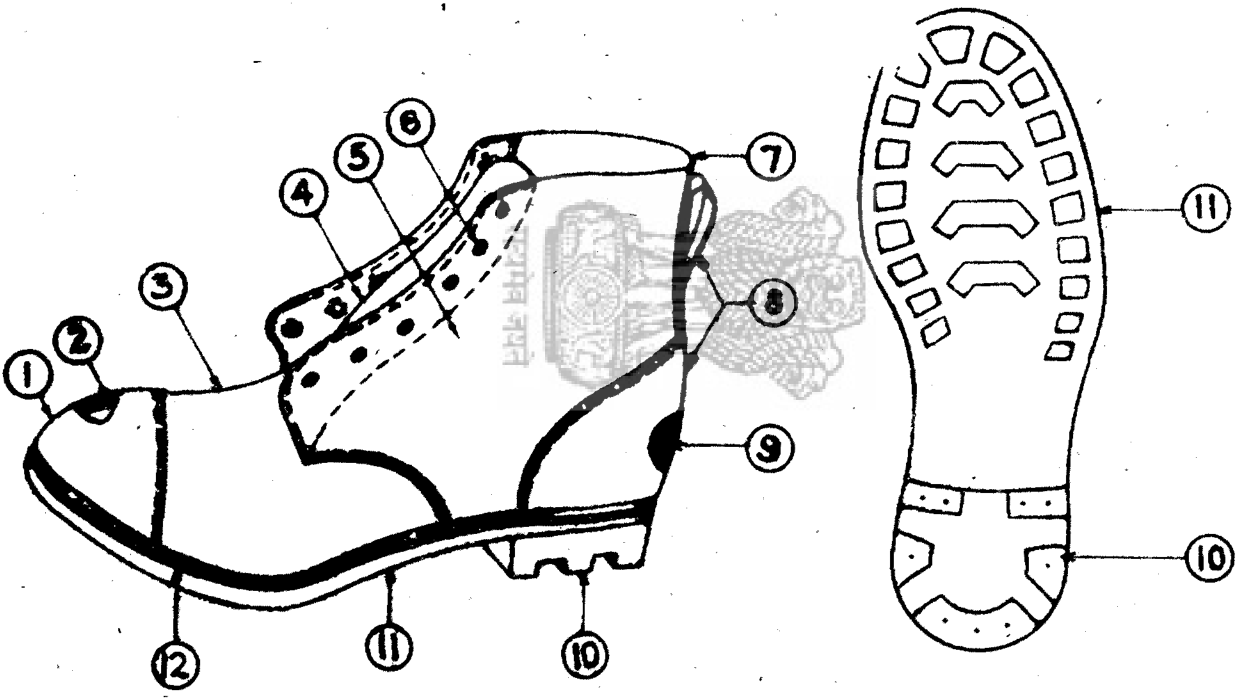


DIAGRAM 2.

COMPONENTS OF BOOTS, MINERS, PROTECTIVE (RUBBER SOLE)

① TOE CAP
② STEEL TOE CAP
③ VAMP
④ FULL BELLOWS TONGUE
⑤ QUARTERS
⑥ EYELETS
⑦ STRENGTHENING PIECE
⑧ OUTSIDE COUNTER WITH LOOP
⑨ STIFFENER (LEATHER)
⑩ HEEL
⑪ OUTER SOLE
⑫ MIDDLE SOLE

$\left.\begin{array}{l}\text{SEAT SOCK}\\ \text{INSOLE}\\ \text{SHANK}\\ \text{BOTTOM FILLING}\\ \text{VAMP LINING}\\ \text{TONGUE LINING}\end{array}\right\}$ NOT VISIBLE

LEATHER LACE------NOT SHOWN

SHOES, MINERS, PROTECTIVE.
(WITH LEATHER SOLE)

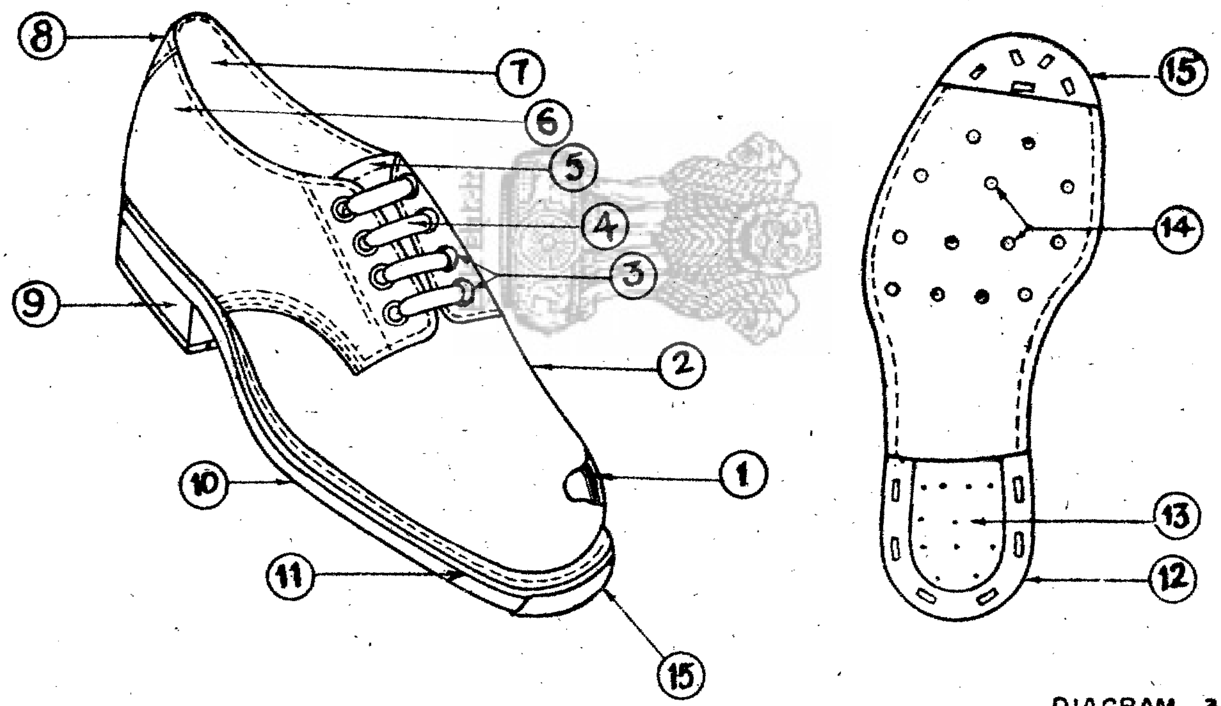


DIAGRAM 3.

COMPONENTS OF SHOES, MINERS, PROTECTIVE, (LEATHER SOLE)

① STEEL TOE CAP
② VAMP
③ EYELETS
④ LACE
⑤ TONGUE
⑥ QUARTERS
⑦ QUARTER LINING
⑧ BACK STRAP
⑨ HEEL
⑩ OUTER SOLE
⑪ MIDDLE SOLE
⑫ METAL HEEL TIP
⑬ TIP FILLING
⑭ HOB NAILS
⑮ METAL TOE TIP

STIFFENER
INSOLE
VAMP LINING
TONGUE LINING
BOTTOM FILLING

} NOT VISIBLE {

SPLIT LIFT
LIFT
SEAT SOCK
SHANK

SHOES, MINERS, PROTECTIVE
(WITH RUBBER SOLE & HEEL)

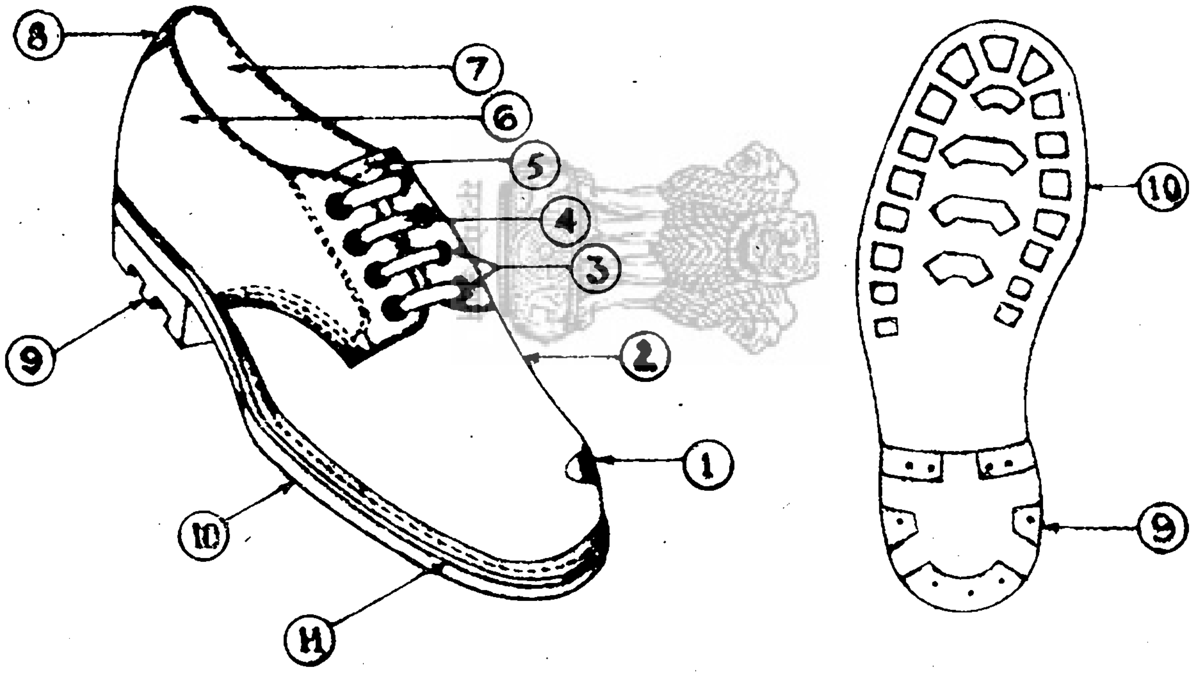


DIAGRAM 4

COMPONENTS OF SHOES, MINERS, PROTECTIVE.
(RUBBER SOLE)

① STEEL TOE CAP
② VAMP
③ EYELETS
④ LACE
⑤ TONGUE
⑥ QUARTERS

⑦ QUARTER LINING
⑧ BACK STRAP
⑨ RUBBER HEEL
⑩ RUBBER OUTER SOLE
⑪ MIDDLE SOLE

NOT VISIBLE:

STIFFENER
INSOLE
VAMP LINING
TONGUE LINING

BOTTOM FILING
SEAT SOCK
SHANK

HOB NAIL & STEEL TOE CAP

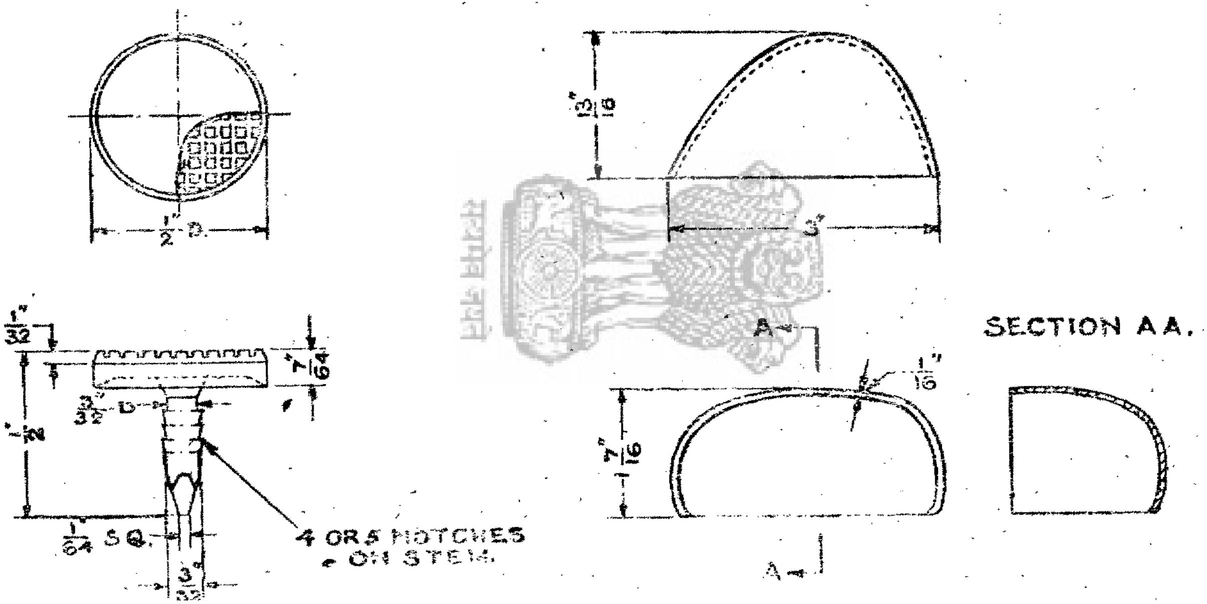


DIAGRAM 5.

TIPS BOOT FULL HEEL & TOE PLATE
(SIZE 3)

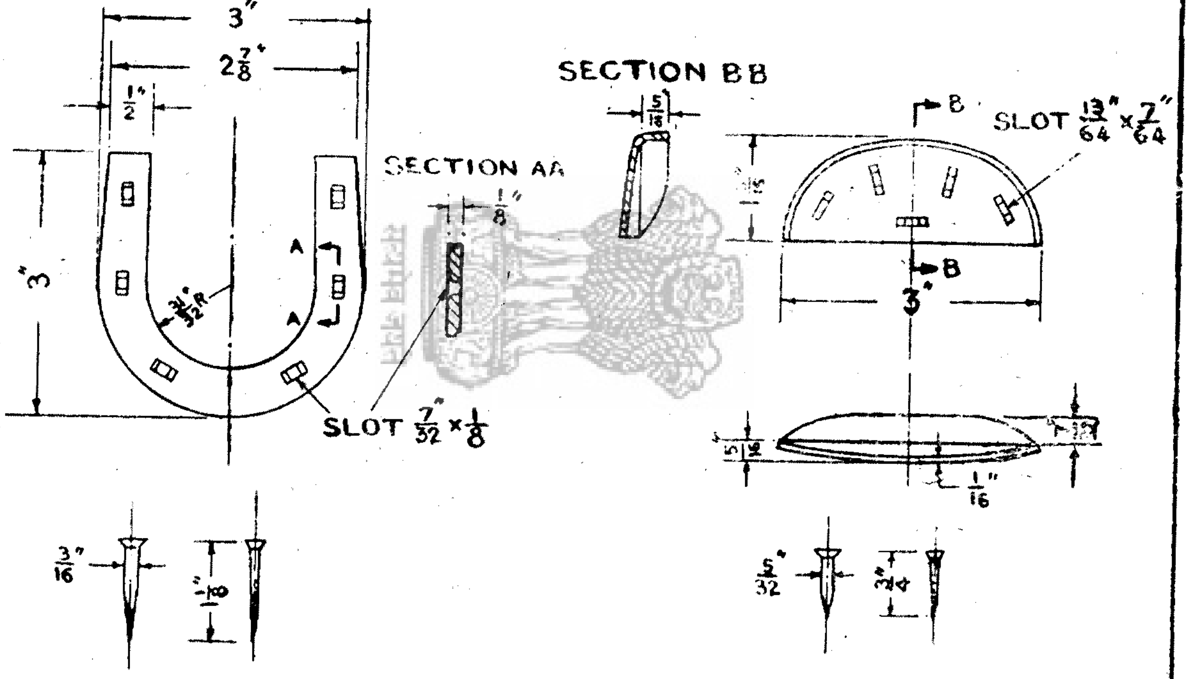
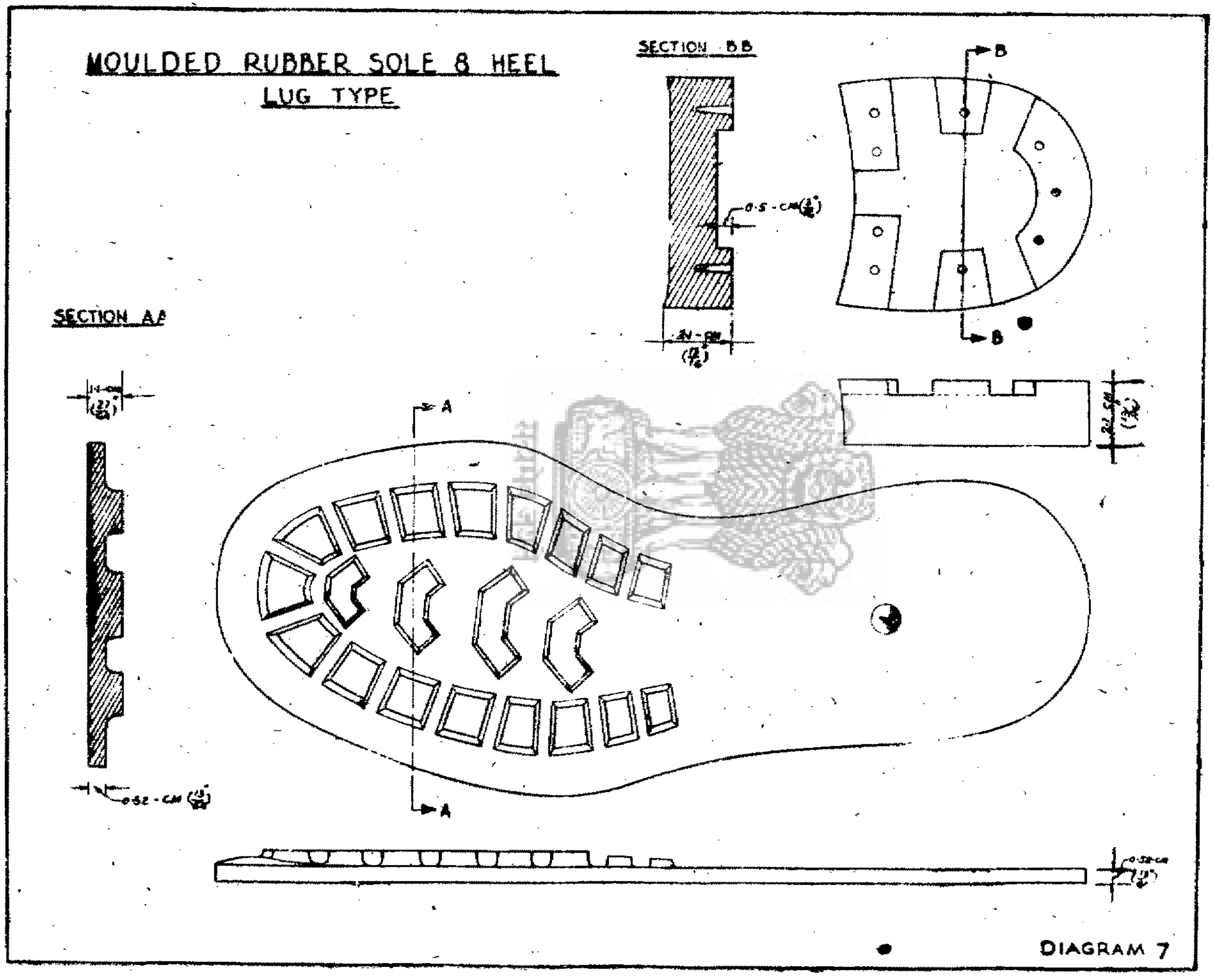


DIAGRAM 6.



MOULDED RUBBER SOLE & HEEL
LUG TYPE

DIAGRAM 7

MAGNIFIED DRAWING OF SCREW WIRE

(GIVING REQD. DETAILS OF ANNEXURE 3)

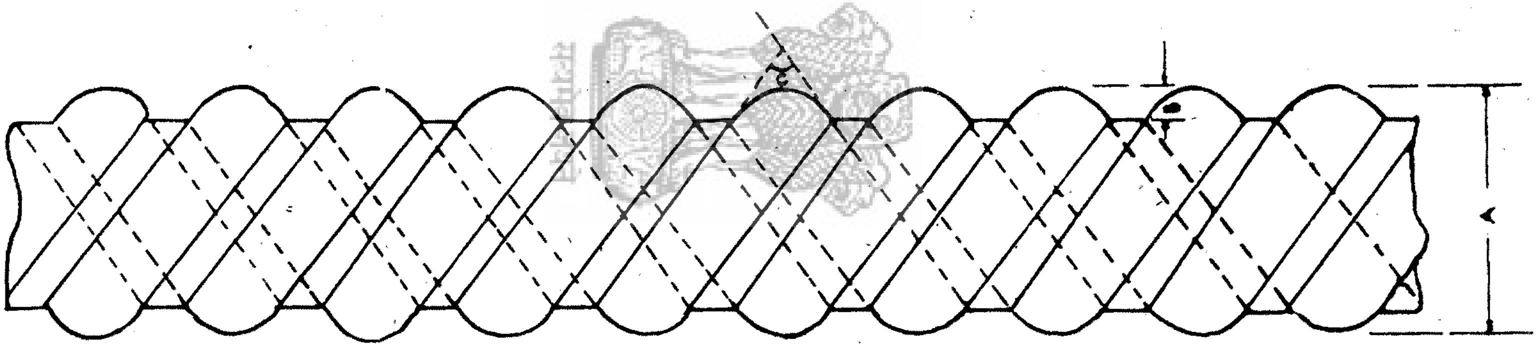


DIAGRAM 8

APPENDIX C

Reports received from the Bhulanbararee Coal Co. Ltd.

I

Reports applicable to all samples

Date of report	*Remarks*
3-11-1959	All are keeping the boots and shoes clean and polished and are using them regularly. They are also using hoses or socks and are finding the footwear very comfortable. There has been no complaint regarding slipperiness even from the wearers of boots and shoes with hobnails. No water is soaking inside, and the feet are kept dry.
18.11.1959	Boots and shoes are being kept clean and polished and are being used regularly. All are using hoses or socks and are finding the footwear very comfortable.
5.12.1959	Do.

II

Reports applicable to individual samples

Description of sample	Wearer	First report (3-11-59)	Second report (18-11-59)	Third report (5-12-59)
(1) Z 419 Leather shoes composite construction Without hobnails With buckles	Trammer	..	..	..
(2) Z 420 Leather shoes composite construction With hobnails With buckles	Trammer	..	Water is soaking and socks are getting wet.	No further complaint regarding waterproofness. There were scratch marks cut by tub ends and couplings. (The trammer rides on the tubs when they are hauled by the haulage.)
(3) Z 424 Leather shoes Without hobnails With laces	Trammer	..	..	..
(4) Z 425 Rubber shoes Without hobnails With buckles	Line Cooly	..		..
(5) Rubber boots Without hobnails With laces	Mining Sirdar	..	Slight wear of sole is noticed.	
(6) Z 949 Leather boots composite construction With hobnails With laces	Overman	..	Slight wear of sole is noticed. The boots are slipping specially on clean inclined stone surface.	No further complaint regarding slipperiness.
(7) Z 950 Leather boots welted construction Without hobnails With laces	Overman	..	Do.	Do.

GMGIPND—L (NS)—98 Lab. & Emp.—14-1-60—2,000